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Gas Journal

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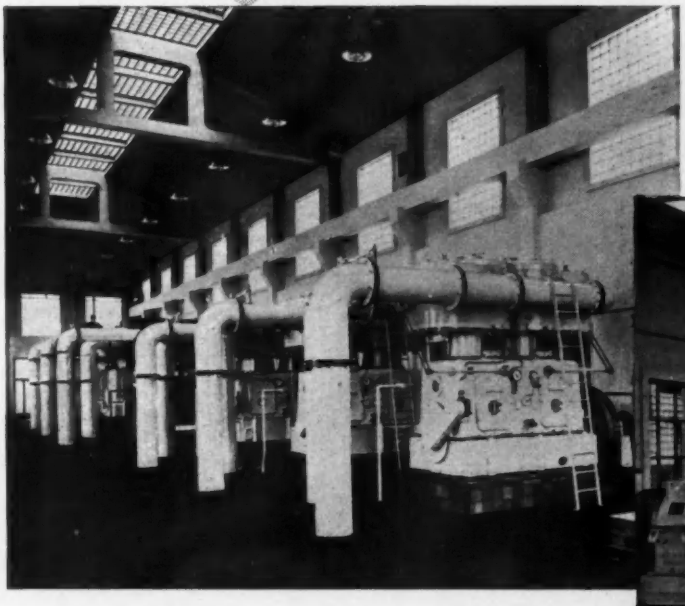

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Illustrations show the interior of the Compressor House comprising:
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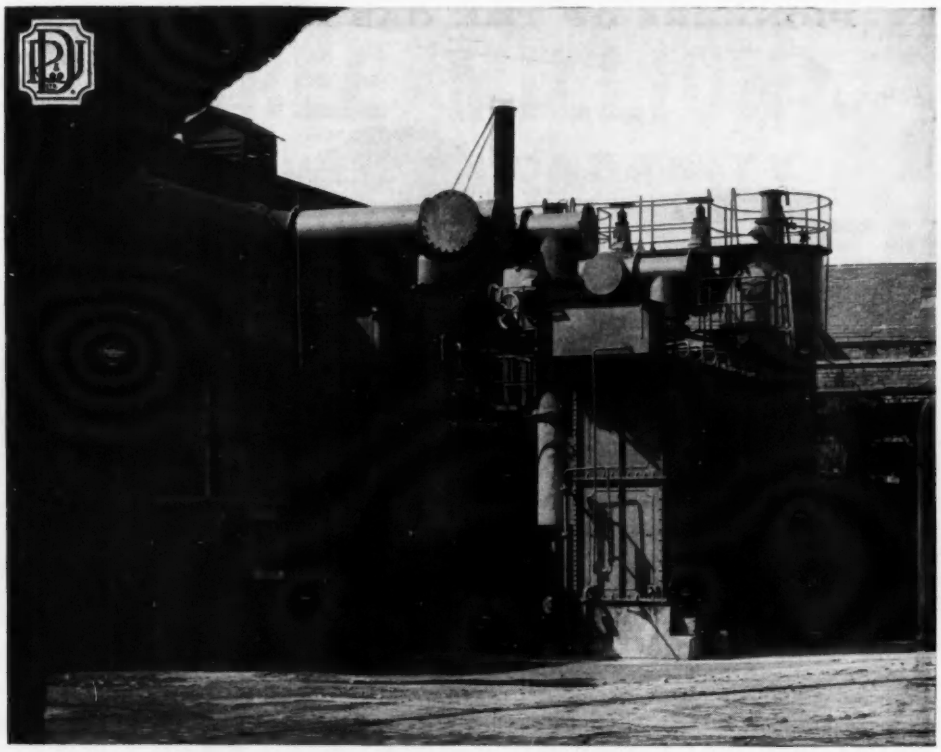

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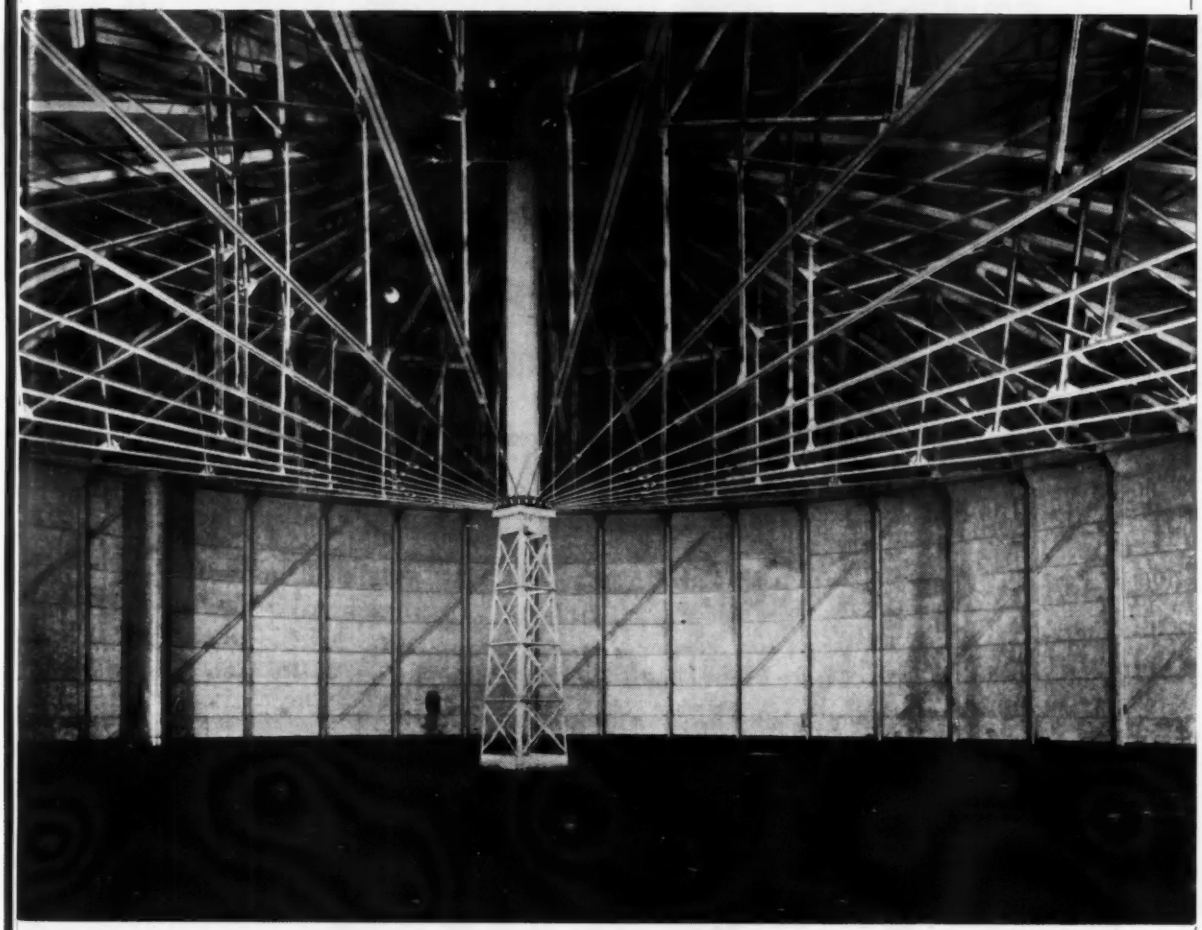

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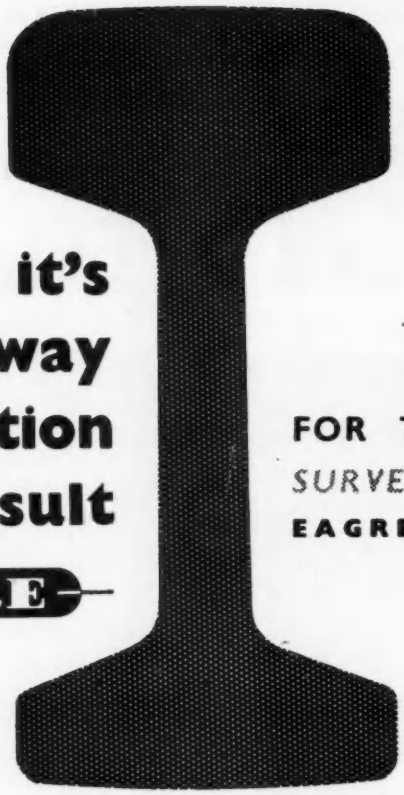

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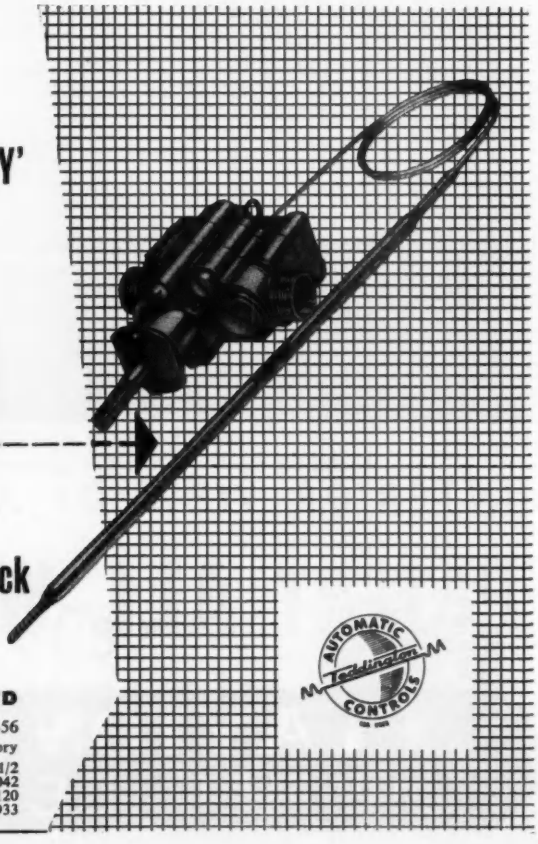

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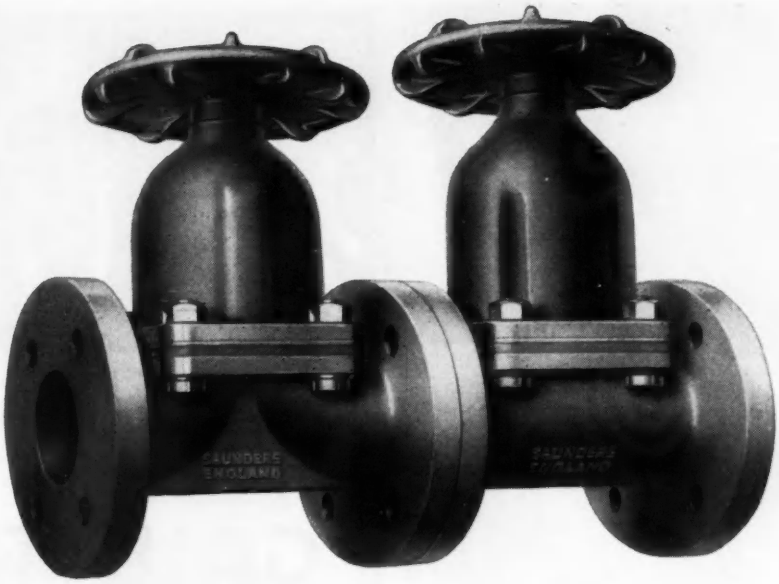
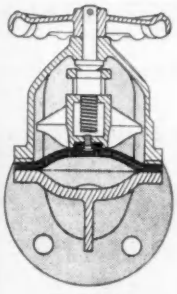


Two Types — A and K but the name's the same



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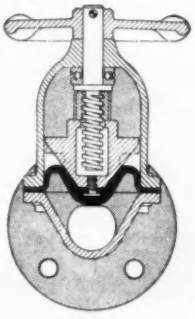

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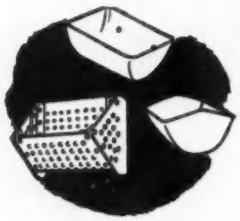

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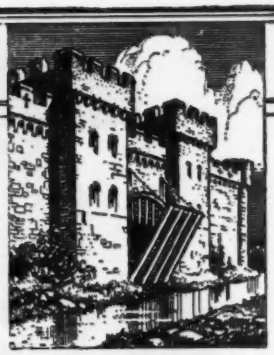

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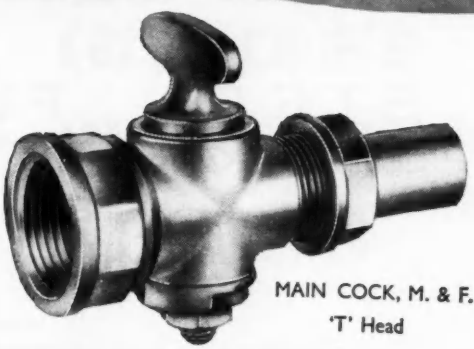

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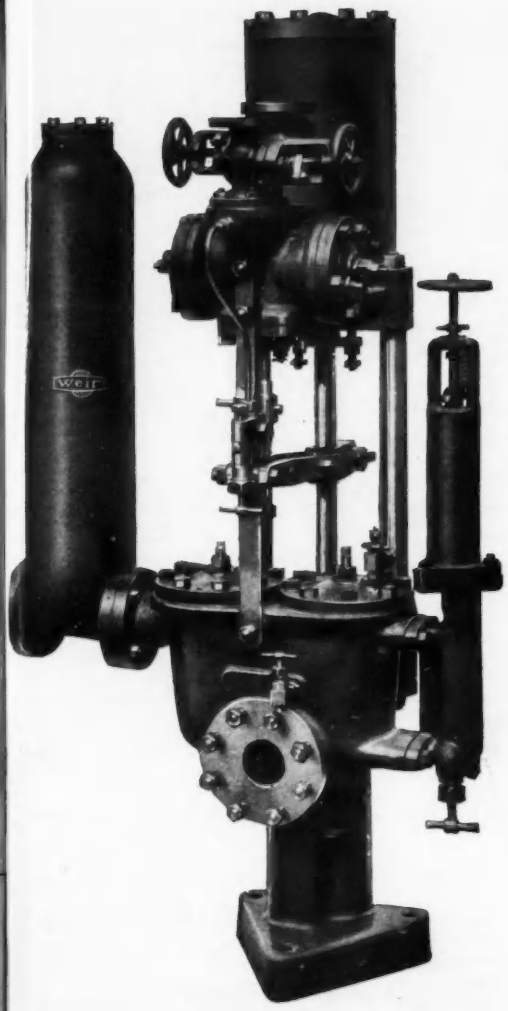

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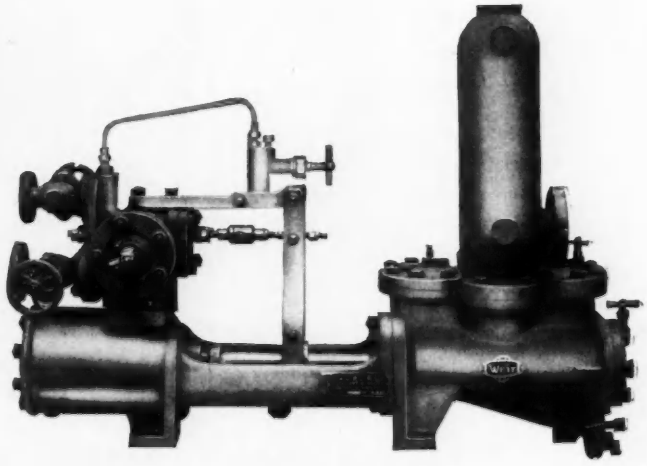

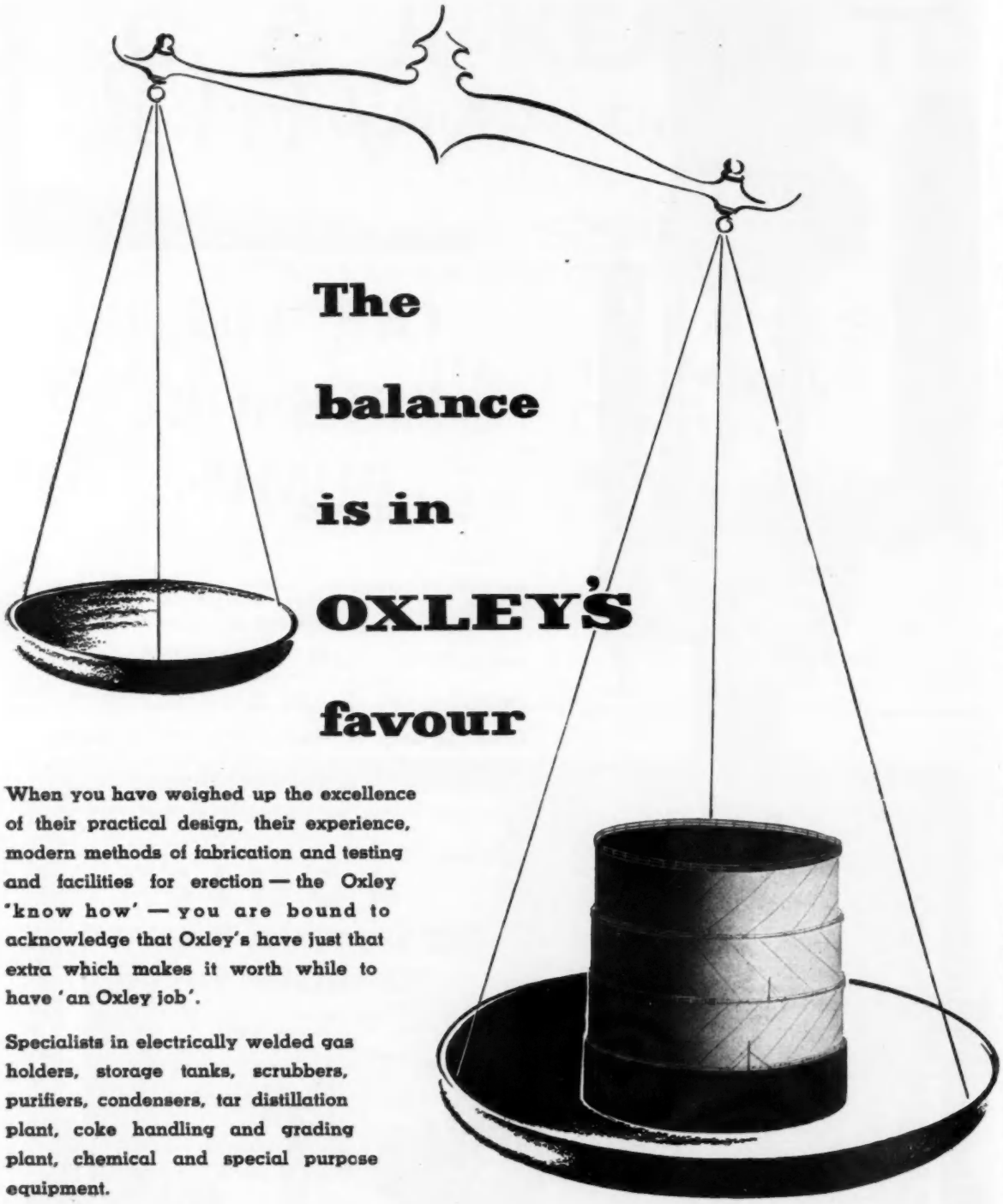

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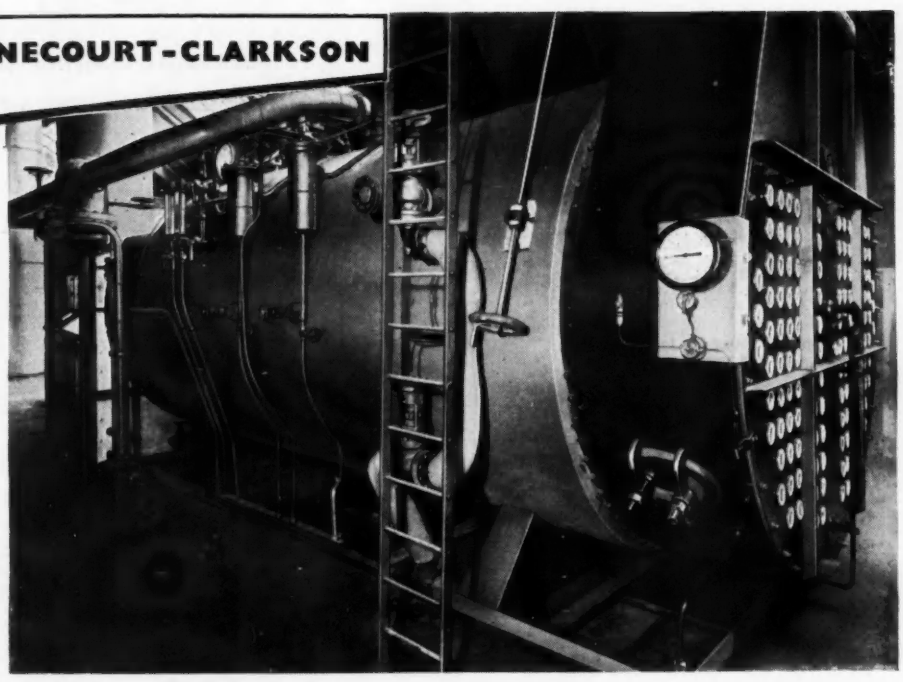

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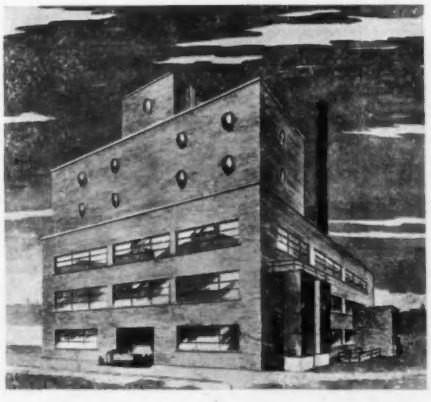

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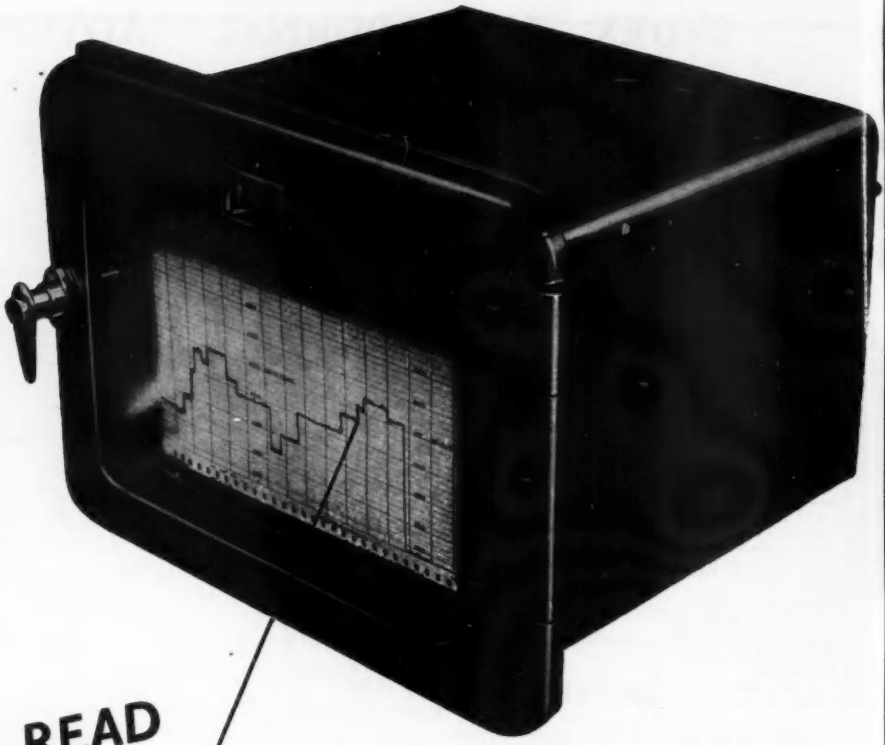

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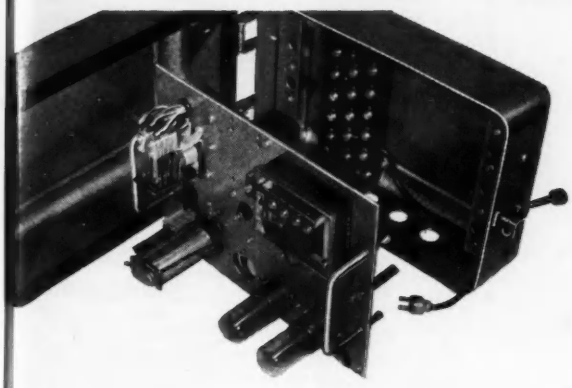

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Gas Journal

VOL. 289 NO. 4885 February 27, 1957

109TH YEAR

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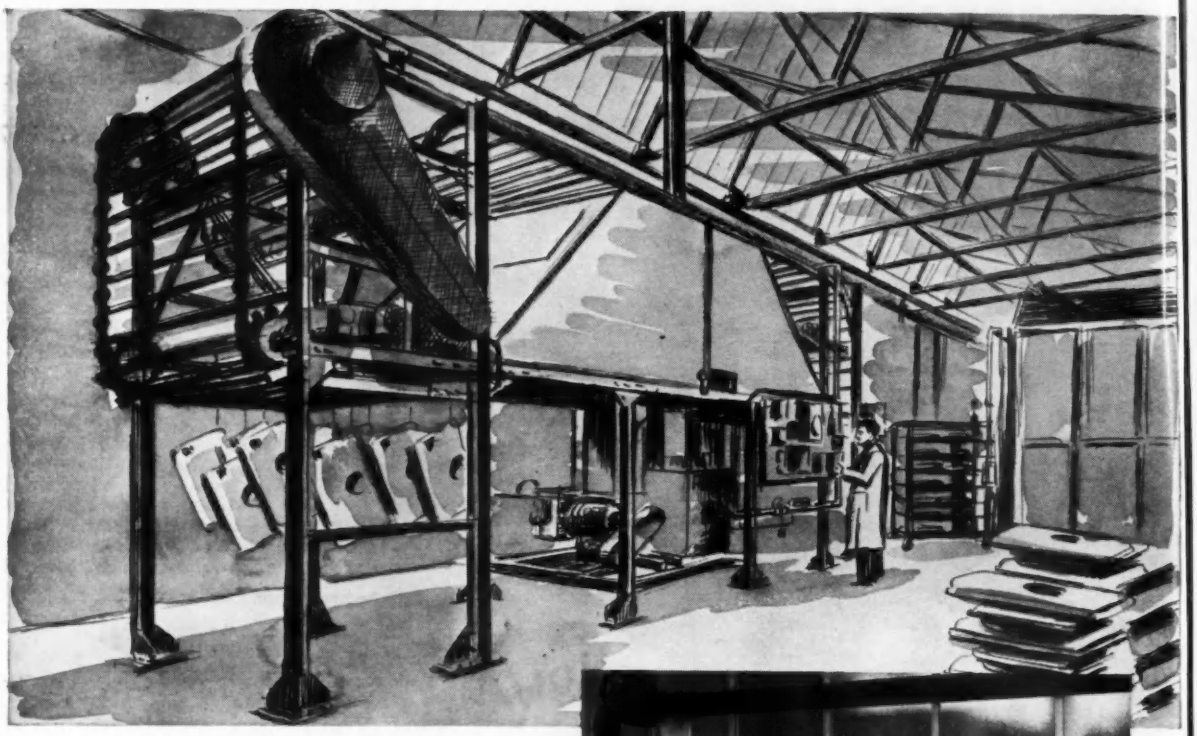

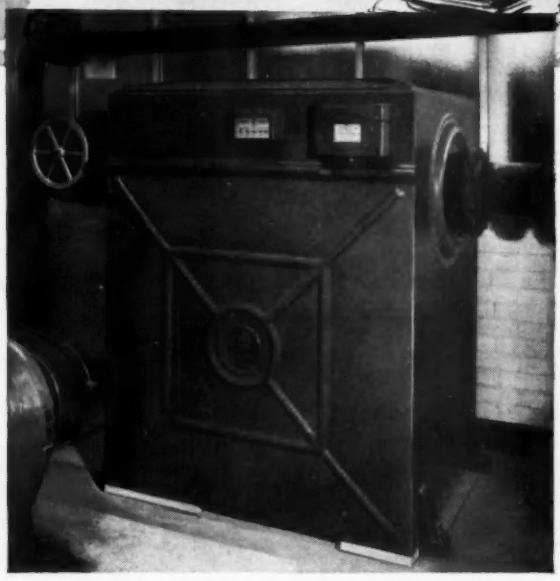

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Gas Journal

VOLUME 289. No. 4885. FEBRUARY 27, 1957. 109th YEAR

Switching Over to Commercial

ONE of the results of nationalisation is a gradual change of emphasis in gas industry thinking, a realisation of the fact that in years to come there may be a need for more specialisation in sales matters and that the Institution sections and Junior Associations may have to devote more of their energies to commercial materials. Basically, of course, these are engineering bodies, but it must be remembered that there are no equivalent associations for sales officers. Gas Salesmen's Circles are now area board concerns and, apart from the national conference, there is no intercourse between ordinary sales personnel of different boards. This is regrettable, although perhaps inevitable. But at all events it must be conceded that the Circles are not intended to provide a means of discussion between senior sales officers; for them the only outlet is the gas engineering association. The result is something of a split in the ranks, although of course a very uneven division. A certain proportion (although not apparently a fixed proportion) of meetings are allocated to commercial matters and, in many cases, these are sparsely attended by engineers. Fortunately both sides show a certain interest in the activities of their colleagues on the opposite side of the industry and there results a wider appreciation of all the working parts of the area gas board machine. But, as we have suggested, the balance may change still further and, ultimately, we may reach a ridiculous position in which there are more salesmen in an engineering association than engineers; it will then have to 'switch over to commercial,' to quote a phrase familiar in another context.

These thoughts were prompted by a paper presented to the London and Southern Section by Mr. L. C. S. Poulter, Manager of the North Thames Gas Board's North Western Division. The author made only passing reference to a possible change in the composition of the Section but this, together with certain other aspects of his paper, encouraged us to speculate briefly along these lines. Under the title 'Mainly Domestic' Mr. Poulter gave a somewhat rambling description of particular aspects of his Board's commercial organisation and put forward his personal views on the future of certain gas loads. In the discussion which followed he was accused of being pessimistic and this, too, raised an interesting question. There sometimes seems to be a belief that when writing a paper it is almost unethical to be pessimistic, on the grounds that morale is impaired. Clearly Mr. Poulter wished to be *realistic* and, of course, few dividing lines are more difficult to discern than those separating realism from pessimism. That Mr. Poulter anticipated some criticism was obvious because he apologised in advance. Having said that unless the relative competitive position of gas and its rivals changed in our favour he could not foresee a big expansion in the domestic gas market, he went on to remark that it was an unpleasant and thankless task to report indifferent news. 'One is liable to be dubbed a "dismal Jimmy" or even a pessimist, but as I see the position, there is little use in deluding ourselves.'

No doubt Mr. Poulter's Board permits him to be as pessimistic (or realistic) as he likes. Others may be less fortunate. One imagines a prospective author's ordeal as he explains to his chairman the theme of his forthcoming paper. 'Sir,' he says bravely, 'I feel the time has come to face facts, to be realistic.' A shadow falls across the chairman's face and he carefully arranges the vase of violets before the desk portrait of Sir Percy Mills. 'Yes, quite so,' he says cautiously, 'but, er, don't you think it might upset the chaps? And think what those dastardly electricians might make of it.' 'But, Sir,' pleads the author, 'surely nothing will be gained by deluding ourselves?' Chairman mutters ominously about morale, looking on the bright side, the united front, defeatism, nobody being indispensable, etc. Author retires and writes hysterically optimistic paper.

However, that is mere imagination. Let us return to Mr. Poulter who is not in our opinion pessimistic, although he exhibits in his paper a certain lack of that aggressive quality which we normally associate with sales officers. Pointing out that not one of the area boards has succeeded in arresting the fall in the average consumption per consumer he suggests that two valid reasons for this (at least as far as the domestic con-

sumer is concerned) are that more efficient appliances are using less gas and that, due to better housing, fewer people are being supplied with gas through one meter. On the other hand, some other reasons for a reduction in domestic consumption may actually increase sales of gas in other directions; the author instances school meals and launderettes. Nevertheless the principal cause is the effect of competition from other fuels and 'this has not received the prominence which it should.' It is not quite clear what the author means by this, but if he is suggesting that there is a disinclination on the part of the industry really to look competition in the eye and study its *raison d'etre* and every detail of its strength and weakness, then we are with him. He regards relative price as being the principal cause of dropping sales and suggests that the commercial side must 'go straight on to increased appliance sales, and at the same time give better and better service.' The difficulty is, of course, to increase the effectiveness of service without unduly increasing costs. Mr. Poulter feels that the answer lies not in altering systems but in inducing employees to take a keener personal interest in all service matters. Unfortunately he does not give any clear explanation of how this desirable end might be achieved.

The bulk of the paper (a short extract appears on p. 459 and a much longer one will be published in the March issue of 'GAS SERVICE') is devoted to a description of the North Thames Board's methods of getting gas into new housing and of compiling consumer records. However, we are pleased to see a section devoted to paraffin, a new and fierce competitor from an unsuspected quarter. Mr. Poulter lists the reasons for the success of paraffin heaters—no purchase tax or installation charges, extreme portability, 'more acceptable' products of combustion—but he fails to give any real indication of how the gas industry should tackle this menace to its space heating load. That is where we think Mr. Poulter shows himself not so much pessimistic as unimaginative. The only real way to beat paraffin is to sell gas—it is as simple as that! Publicity, advertising, and the whole sales approach must be aimed at hitting the paraffin market where it is weakest—storage, frequent re-fuelling, lack of adjustment, and occasional shortage of supply. One of the most pressing needs of the gas industry today is to shake off the inferiority complex and—here's that word again—pessimism which surrounds gas space heating. Mr. Poulter has missed an opportunity here. A purely factual commercial paper can be both interesting and helpful, but to be wholly successful it must contain a hint of inspiration.

Technical Education in Russia

IN the last few months we have referred to technical education on the Continent of Europe and in America on several occasions and have compared our efforts in England to those abroad. It is common knowledge that tremendous efforts are being made in Russia, but there has been little reliable information available, so that any comparisons that have been made have had to be confined to Western Europe. It was with very great interest, therefore, that we read the report presented to the Councils of the Institution of Civil Engineers, Mechanical Engineers and Electrical Engineers, the Minister of Education, and the British Council by a team of nine engineers which visited Russia in September, 1956, led by Professor Giffen, Professor of Civil and Mechanical Engineering at London University and under the auspices of the British Council.

The very great need which Russia has for technologists immediately becomes apparent when it is considered how backward she is in the amount of available power per head of the population and the very great efforts which are being made to make good this deficiency and eventually to equal if not surpass the other industrial nations in Western Europe and America. As the report says, 'Russia . . . . will not relax until this leeway is made up. We should look at engineering education in Russia against this background of urgency.'

It is scarcely surprising, therefore, that Russia is letting nothing stand in her way to achieve this. Shortage of buildings, or for that matter time, is no reason for hesitation, nor is lack of money.

The State is the only employer and as such has complete control of the direction of industry by the issue of five-year plans. Directly one of these has been announced the next one is being worked out, and one of the objects of such projects is the planning of education and the teaching profession. To make quite certain that enough students come forward to take engineering studies, incentives seem to have taken the place of direction, and as a result the social and financial status of the engineer is greatly enhanced. In fact he is the second best paid man in the community, second only to the teaching profession itself. This indeed is a change from the usual opinion in this and other countries since the shortage of engineers and technologists here has sometimes been put down to the disadvantages they suffer because their professions do not happen to be 'U' at the present moment. In Russia, however, there are no such difficulties, in fact it has been calculated that for every vacancy available in the engineering schools there are 3.6 candidates. To accommodate the vast numbers that are accepted, the courses are run on a shift system, there being two shifts a day six days a week. As more buildings become available, however, the need for the two shifts will become less and will probably eventually disappear. The teaching staffs do not seem to be overworked because of the shift system, since the ratio of students to staff appears to be the same as in this country at 10:1, and to maintain this ratio, to make quite certain that proper instruction is given, not only for education but for higher education generally, the academic profession is made the most attractive financially in the country. A professor is better paid than his counterpart in industry. The students, too, are helped financially irrespective of their private income, if any, and those who are prepared for the careers and professions, which do not attract the majority of students, are given financial inducements to do so.

The number of engineering diplomas awarded in Russia in 1955 may be taken, according to the Report, as 65,000. In Great Britain, if the number of students who have qualified for the associate membership of the major engineering institutions is taken; these will include University degrees, those college diplomas treated by the institutions in the same way as University

degrees, and a proportion of Higher National Certificate awards shown to be of professional quality, the number of engineering students who qualified in 1955 is about 5,000. Even if the far larger population is taken into account, the proportion of qualified engineers entering industry for every million of the population is considerably less in England.

Before a really fair comparison can be made, there are, we think, a number of points to be considered. One of these is the trend of the intake of engineering students. It appears that the number of full time students has reached the desired figure so that the numbers will not be increased but will remain constant, but the numbers of evening students which amounted to about a quarter of the total in 1950 had risen to nearly a half by 1956, and is expected to rise still further. This seems to be the complete reverse of what is happening in this country. To account for this it appears that by 1960 the output of engineers will be enough to fill the need and no expansion is required, buildings are filled to capacity, and by 1960 secondary education will become compulsory at the age of 17. More students will then be seeking admission to the institutes.

What of the quality of those who gain their diploma? The set-up is somewhat different to Great Britain, in that the students enter the engineering institutes rather younger at 17 to 18 with similar qualifications to the G.C.E., and stay for five to five and a half years to complete the course, two years or so longer than here, but the last two years are taken up with very specialised training. On the whole 87% of those entering get their diploma as compared with about 20% of the students in England who fail their first year. But what could not we do with 3.7 candidates for one vacancy? In Great Britain, when the student has graduated or received his diploma he will get his specialised practical training with industrial firms which will train him at their own expense, whereas in Russia a specialised engineer with some experience in research work will go straight into his own particular industry ready made to take over some particular piece of work. Which type of man does industry prefer? Perhaps the latter since it may save them a good deal of expense in further training. Another point made in the report is that women are also being trained as engineers and are studying alongside the young men. This as yet is almost unheard of in England, though perhaps not impossible to imagine.

The general conclusion of the report is that the engineer being turned out in Russia is in no way inferior to his counterpart in Great Britain, but how long can this terrific output be maintained and how long will the immense demand remain unsatisfied?

Personal

MR. J. E. C. BAILEY, C.B.E., Chairman and Managing Director of Baird & Tatlock (London) Ltd., Hopkin & Williams Ltd., and W. B. Nicolson (Scientific Instruments) Ltd., is making a short tour of Africa to discuss general matters relating to the export of scientific equipment and chemicals with the Companies' representatives and agents in Johannesburg, Durban, Salisbury, Ndola, Nairobi, and Kampala.

MR. B. C. MORTON, Managing Director of Robert Dempster & Sons Ltd., of Elland, leaves England on March 28 for a business visit to South Africa. He expects to be away about six weeks. It is 50 years last month since Mr. Morton joined the firm, and apart from a short break, all his business career has been spent with them.

MR. R. WATKINS has been appointed to represent the Cambridge Instrument Co., Ltd., at 7, Norfolk Court, Norfolk Street, Glasgow, and will handle enquiries and consultations regarding new instruments. MR. S. J. STEEL will continue to deal with repairs and service matters.

MR. S. G. BROWN has joined the Board of Plenty & Son Ltd., of Eagle Iron Works, Newbury, Berks.

Diary

February 28. — INCORPORATED PLANT ENGINEERS, SHEFFIELD AND DISTRICT BRANCH: Grand Hotel, Sheffield, 7.30 p.m. 'An Interpretation of the Clean Air Bill.'

March 1. — LONDON AND SOUTHERN JUNIORS: Meyerstein Theatre, Westminster Hospital School of Medicine, Horseferry Road, S.W.1, 6.30 p.m. General Meeting. 'The Quantities Involved in the Rating and Performance of Dry Purifier Installations,' by F. H. Cope.

March 2.—SCOTTISH WESTERN AND EAST OF SCOTLAND JUNIORS: Gas Showrooms, 522, Sauchiehall Street, Glasgow, C.2, 3 p.m. Joint Meeting.

March 5.—EAST MIDLANDS G.C.C.: Victoria Station Hotel, Nottingham, 11.15 a.m.

March 5.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, S.W.1, 11 a.m.

March 5.—INSTITUTION OF CHEMICAL ENGINEERS: The Geological Society, Burlington House, London, W.1, 5.30 p.m. 'Radiation from Luminous Town Gas Flames,' Parts I and II, by S. R. Tailby, M. D. Ashton and I. Berkovitch.

March 5.—MIDLAND JUNIORS: Staff Mess Room, West Midlands Gas Board, Birmingham District, Council House, Birmingham. 'Industrial Gas Forum.'

March 6.—SOUTH WESTERN G.C.C.: Taunton, 11 a.m.

March 6.—JUNIOR INSTITUTION OF ENGINEERS, MIDLAND SECTION: James Watt Memorial Institute, Great Charles Street, Birmingham, 7 p.m. 'Fuel Economy and Heat-Electric Generation,' by Mr. Bryan Donkin.

March 8.—JUNIOR INSTITUTION OF ENGINEERS: Pepys House, 14, Rochester Row, Westminster, S.W.1, 7 p.m. 'The Treatment of Effluents,' by Arthur H. Waddington.

March 9.—YORKSHIRE JUNIORS: Bradford: Open forum for discussing the effect of the Clean Air Act on the gas industry.

March 9.—MIDLAND JUNIORS: Station Hotel, Dudley, 6.30 p.m. Annual dinner.

March 11. — CHEMICAL ENGINEERING GROUP: Society of Chemical Industry, 14, Belgrave Square, London, S.W.1, 5.30 p.m. 'A Survey of Industrial Filtration,' by A. P. Hosking and K. C. Salter.

March 12.—LONDON AND COUNTIES COKE SALES CIRCLE: Connaught Rooms, Great Queen Street, Kingsway, W.C.2. One-day coke salesmen's conference.

March 13. — SCOTTISH G.C.C.: 26, Drumsheugh Gardens, Edinburgh 3, 11.30 a.m.

March 13.—COMBUSTION ENGINEERING ASSOCIATION: The Kingsley Hotel, Bloomsbury Way, London, W.C.1, 10.30 a.m. and 2.30 p.m.

March 13.—INSTITUTE OF FUEL: Institution of Civil Engineers, Great George Street, London, S.W.1, 5.30 p.m. 'The work of B.C.U.R.A. on the Coking Stoker,' by M. V. Murray.

She'll Need Some Honey and Plenty of Money!

HOME service adviser for the North Western Gas Board, Oldham and Rochdale District, 29-year-old Miss Judith Murray will be one of an 18-strong crew which will leave England early in April in a small ketch bound for New Zealand.

Most of the crew, who met in London recently, are to emigrate, but not Miss Murray. 'I'm just doing it for the experience, and I shall probably return home,' said Miss Murray who lives in Drake Street, Rochdale, Lancs.

Cooking arrangements? Although she has extensive experience of food preparation and is the only professional cook among the seven female crew members, Miss Murray does not expect to do the whole of the cooking—the routine will be one week on cooking and three weeks on general duties. A solid fuel appliance will be used.

Her friend, Mr. G. Taylor, of Rochdale, will accompany Miss Murray on the trip Down Under.

RISING COSTS AGAIN PUSH UP PRICE OF GAS IN BELFAST

Average Consumer will Pay 3d. a Week More

BELFAST gas prices are to go up again. From March 3 an increase of 6¾d. net per 1,000 cu.ft. is planned. The rise, for which higher costs of materials and wages are blamed will amount to 1½d. per therm, and will cost the average domestic consumer about 3d. a week.

The new charges, which are subject to the approval of the City Council, will come into effect from March 1 for ordinary consumers and from the beginning of the next clearance after that date for auto-consumers. It will also be necessary to obtain the sanction of the Ministry of Commerce for part of the proposed increase under the Gas Charges (Northern Ireland) Order of 1949.

The last increase was last July, when charges were raised by 4½d. net for ordinary consumers.

£61,000 Deficit

In a recent report presented to the Gas Committee the Gas Manager, Mr. J. L. Hyslop, said when the charges were last reviewed they were faced with increases of £159,000 a year for coal and wages, but the increased rates for gas then imposed were estimated to produce only £98,000 a year.

They were then restricted in the amount by which they could increase their charges, because they had reached the statutory maximum price fixed under an Act of Parliament, and a special order to permit a higher maximum price had not been obtained. This order had now been made and it was possible to review the charges.

Examples of the new domestic rates are—up to 10,000 cu.ft., 8s. 10⅞d. net per 1,000 cu.ft.; 9s. 5⅝d. for householders outside the city boundary and 9s. 7⅞d. for Holywood consumers. There are cheaper rates for higher consumptions.

LONG SERVICE AWARDS

Thirty-six employees of the South Eastern Gas Board were presented with long service awards at the Board's Croydon headquarters last week. Pictured above, the Chairman, Mr. W. K. Hutchison (right) presents a gold watch to Mr. A. Bell, the Board's newly appointed Sales and Service Manager, Sussex Division.

Edinburgh's new service and sales centre in Waterloo Place, described in detail in these columns last week, has been officially opened by Lady Banks, the Lady Provost of Edinburgh. Picured above is the showroom, looking towards the street entrance.

Fairy Lights?

TWO gas street lamps in his back garden will soon be helping Bilston Councillor William R. Gardner to celebrate on special occasions.

He bought the lamps for about £5 from his Council. For a further £5 he intends having them installed in the back garden of his home in Quinton, and whenever he or his family have something to celebrate they will be lighted.

Son of a Bristol gas engineer, Mr. Gardner feels kindly towards gas lamps. 'They give a warm friendly glow,' he says, 'and are more satisfying to look at than the concrete monstrosities being put up today.'

Coke Screening Plant for Bangor (N.I.)

BANGOR (Co. Down) Borough Council has decided to install a coke screening and grading plant at the local gasworks. The Manager, Mr. J. A. Derbyshire, in a report showing the advantages of the plant over the present system of manual handling, states that there will be an estimated saving of £500 per annum in labour charges.

Four men and a crane driver are at present employed in handling coke in the yard, costing in wages approximately £2,200 a year.

By installing a coke grading plant a good local coke market can be built up, not only by the gasworks, but also with the co-operation of local coal merchants.

The capital cost of a coke screening plant having a capacity of 10 tons per hour will be about £12,000.

Reducing Damage to Vitreous Enamelled Goods in Transit

WORK OF NEW DEVELOPMENT COUNCIL

DESIGNING improved methods of packing vitreous enamelled products to minimise damage in transit is one of the important tasks which the newly-formed Vitreous Enamel Development Council is undertaking.

The Council will work on the lines of the safe transit programme adopted in the United States, which reduced high losses from damage in transit to such a marked degree that from being a daily hazard it is now almost unheard of. Such a programme can save industry enormous sums of money and greatly improve customer relationship.

The essence of the safe transit programme is close co-operation between companies manufacturing package materials and the manufacturers of the vitreous enamelled products. Packs designed for a particular product are rigorously tested by machines which simulate conditions most likely to cause damage such as accidental dropping, violent shunting of a goods train, sharp braking of a delivery truck, or some other article falling on the package.

Apart from the savings such a programme can bring in cutting down replacements, insurance companies are expected to give preferential rates for enamelled products packed in materials or containers approved by the safe transit programme testing house.

Further details of the programme will be released by the Vitreous Enamel Development Council at its general meeting at the beginning of March at the works of Ernest Stevens Ltd., Cradley Heath, Staffs.

THE PRIZE GIVING

Mr. David Beavis, Controller of the Edinburgh Division of the Scottish Gas Board, is seen making one of 130 presentations to successful candidates of the Edinburgh Further Education Centres who won certificates in the 1956 examinations of the City and Guilds of London Institute.

LONDON GAS FIRED BOILER BUSINESS CHANGES HANDS

THE business of Autocontrol Boilers, Ltd., 167, Temple Chambers, Temple Avenue, London, E.C.4, suppliers of 'Vesta,' 'Vertex,' and 'Vulcan' gas fired boilers for central heating and hot water supply, has been taken over by Hattersley Bros., Ltd., Queen's Foundry, Swinton, Mexborough, Yorks.

Mr. T. E. Norvell, for many years associated with Autocontrol Boilers, Ltd., has been appointed General Manager of Hattersley Bros., Ltd., gas division. The office of Autocontrol Boilers, Ltd., is being closed, and the staff, including Mr. Norvell, will move to the London office of Hattersley Brothers, Ltd., at 184/185, Temple Chambers, Temple Avenue, London, E.C.4. Telephone No. FLEet Street 0807.

Hattersley Brothers, Ltd., have for many years manufactured the gas fired boilers, and they will continue to do so under the same trade names.

Cleanglow in Whitehall

CLEANGLOW, the new North Thames Gas Board smokeless solid fuel, is to be burned in the fireplaces of the Admiralty, the Home Office, the Treasury, and the Office of Commonwealth Relations in Whitehall. This decision was made after tests carried out by the Ministry of Works.

Compoflex to Market Rigid Tubing

NEW MANUFACTURING GROUP FORMED

HAVING acquired the entire share capitals of Rollo Hardy & Co., Ltd., and Tube Making Machines, Ltd., Compoflex Co., Ltd., of London, are extending their flexibles advisory and manufacturing facilities to include certain forms of rigid tubing.

At the advisory centres in London and Oldham, potential customers can obtain unbiased advice on the most efficient flexible to use for any given situation.

As the only manufacturers producing plastics, rubber, metallic, and composite hoses within one organisation, Compoflex claim to operate the only comprehensive flexibles service in the world. The extension of this service to include rigid tubing is considered a logical development.

Rollo Hardy & Co., Ltd., produce rigid welded, and welded and drawn, stainless steel tubes, while Tube Making Machines, Ltd., manufacture mild steel tubing and design and produce tube-making machinery and equipment.

Both companies will continue their activities and will operate as independent manufacturing organisations, but the two sales organisations have been absorbed into the parent company's new rigid tube division, and the export departments have been integrated with the Compoflex export division. A large-scale expansion programme is planned for the two companies.

Mr. J. C. W. McCallum and Mr. J. V. Klein, the Joint Managing Directors of Compoflex Co., Ltd., hold similar appointments also on the Boards of both the newly acquired companies. Three senior executives of Compoflex have been appointed also to the Board of Rollo Hardy & Co., Ltd. They are Mr. S. Polkinghorn, General Manager (Commercial); Mr. W. N. Matts, Purchasing Manager; and Mr. M. W. Wilson, who will be also resident Director of Tube Making Machines, Ltd.

Mild Weather Hits Gas Sales in N.W.

Gas distributed by the North Western Board in January amounted to 35,294,000 therms, 2.2% less than in January last year; but over the ten months of the Board's eighth financial year up to and including January, 1957, gas sent out showed an increase of 0.3% over the equivalent period during 1955-56.

The January decline coincided with the mild weather when mean weekly temperatures in Manchester averaged 42.1°F. compared with 39.5° during January, 1956.

GASSING ACCIDENTS IN THE IRON AND STEEL INDUSTRY

The sub-committee of the Accident Prevention Committee of the British Iron and Steel Federation, which was set up in 1954 to investigate gassing accidents in iron and steel works, and to recommend means of reducing the risk of gassing, has now completed its task.

The findings and recommendations of the sub-committee are published in a well illustrated booklet which has just become available. It is presented in two parts, part 1 containing conclusions, recommendations and consideration for safe working; part 2, reviewing gassing accidents that occurred in the industry from 1952 to 1954, and dealing with detection, personal protection, and resuscitation.

Investigations continue, and it is hoped to supplement the report periodically.

THE OIL CRISIS AND THE GAS INDUSTRY

No Cut in N.W.G.B. Essential Transport but 'Frills' Are Out

WITH petrol rationing in its eleventh week, how is transport in the gas industry being affected? As an example, Col. W. H. Slack, Transport Manager of the North Western Gas Board, says there has been no cut in essential services, though 'frills,' promotional selling and so on are 'out.'

Petrol pump attendant William Williams at Gaythorn in Manchester used to dole out 1,200 to 1,300 gal. of fuel to commercial vehicles every week. Now the figure is down to about 800 gal. Three or four hundred gal. of premium petrol went to private Group and Board cars; that figure has been reduced to 100 gal.

Just as Busy

Rationing has not meant much less work for Mr. Williams. He used to be able to fill the tanks of some vehicles in the morning, some at lunchtime and some in the evening before they were garaged, thus spacing out the job. Now the Alan Taylor appliances and tankers which used to be brought in at lunchtime are taken instead to the nearest depôt, to save petrol, and they have to be added to the morning or evening jobs. The main slackening off in demands for petrol has come from Board officials.

Mr. Roberts, the Board's Training Officer, averaged 700 miles a month by road before petrol rationing. In December he covered only 31 miles.

No Double Journeys

Mr. Fletcher, the Manchester Group's Smokeless Fuel Officer, has had a busy time fulfilling orders for Phimax and coke, but all have been routed efficiently and economically. He has had co-operation from householders, and his men have had to use virtually no petrol on double journeys.

Tom Kimber, who drives the Board's medical vehicle, used to be out every day with the Board Medical Officers, but now finds that he is driving only about three days a week.

On the other side of the picture, the mechanics find that petrol rationing is enabling them to devote more time to servicing and repairing the cars they are responsible for.

Of the Board's 1,000 commercial vehicles, 168 motor-cycles, and 500 items of mobile plant, 90% are petrol engined which, observes Col. Slack, is fortunate in view of the greater shortage of diesel oil. The Board has also been fortunate in having an advantageous agreement with British Railways for the transport of coal.

On the gasmaking side, the Board are making, at the request of the Ministry, a 22% reduction in the use of oil to enrich water gas. Only the Liverpool Group, which has a relatively high percentage of C.W.G. production, is likely to be in any difficulty as a result. The Board reports little swing toward gas by oil-using industries in the area.

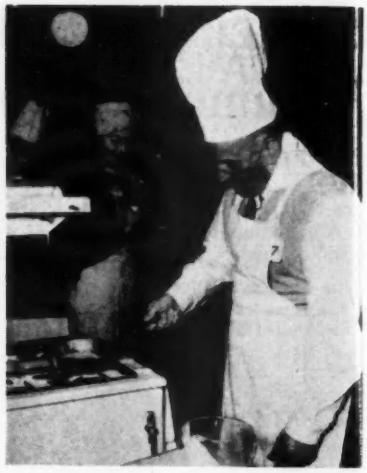
Put Another Plastic in . . .

Plastic coins which people can buy for use in electricity and gas meters are suggested by Eckington (Derbyshire) Parish Council to overcome an acute shortage of shillings. The Council says local banks have run out of shillings, and villagers are without light or power for cooking.

SUCCESSFUL FITTER APPRENTICES RECEIVE AWARDS

The Gasfitting Centre, Newcastle-upon-Tyne, was recently the scene of the presentation of certificates awarded by the Northern Counties Technical Examinations Council and the City and Guilds of London Institute to candidates who were successful in the 1956 examinations. In addition, prizes were donated by the Northern Gas Board to apprentices with outstanding results in the examinations.

Presentations were made by Alderman B. Ramsey, President of the Northern Counties Technical Examinations Council. The chair was taken by Mr. E. Crowther, C.B.E., Chairman of the Northern Gas Board.



Miss E. Rittson, Assistant School Meals Organiser, Birmingham Education Department, is seen watching one of the pancakes being cooked.

NINE VOLUNTEERS SHOW WHETHER MEN CAN COOK

CAN men cook? is a question which Birmingham and District Division of the West Midlands Gas Board were able to answer when their Sales and Service Association held their February meeting. Nine volunteers from the sales and fittings staff donned aprons and chef's hats and set about cooking a pancake.

The audience had not been allowed to think that all a gas cooker could do was to bake, burn, or fry a pancake. Before the light comedy was introduced, Mrs. G. J. Perry, Senior Home Service Adviser for the Division, had cooked a full dinner to illustrate the correct use of the oven.

In conclusion, Mr. E. J. Aulton, Chairman of the Birmingham Sales and Service Association, thanked everybody concerned in the demonstration, and said it had been given to make the selling staff realise that to be a good gas salesman it is necessary to have a basic knowledge of cookery.

NEWS IN BRIEF

SOON THERE'LL BE NONE

AVAILABILITY of coke oven gas on the Wales' Gas Board's grid system will shortly close Abertillery, Mon., gasworks, one of the last remaining small plants in South Wales.

Gasmaking might be resumed for short periods during the winter says the Manager, Mr. D. S. Davies; and no redundancy is expected as men employed on shifts will probably be transferred to other areas.

Proposed increases in the price of gas for street lighting by the North Eastern Gas Board of from 11½d. to 1s. 2d. a therm would increase the Leeds Corporation Street Lighting Committee yearly gas bill from £62,000 to £74,000.

Presentations to mark their retirement last year were made recently by Mr. W. M. Gledhill, Stirling Gas Manager, to Mr. Dan Watson, Mr. T. Paterson and Mr. P. Reid.

From a paper to the London and Southern Section, I.G.E., February 19.

Mainly Domestic

By L. C. S. POULTER, M.Inst.Gas E.,

DIVISIONAL MANAGER, NORTH WESTERN DIVISION, NORTH THAMES GAS BOARD.

I INTEND to confine myself mainly to domestic matters in which our position is not as secure as we would wish, and to base some of my observations against the background of the North Western Division of the North Thames Gas Board, which had for the year ending March 31, 1956, a total of 349,810 main meters—162,846 credit and 186,964 prepayment—and 38,141 check meters. The territory covers about 90 square miles and there is a considerable amount of light industry with an additional substantial commercial consumption. For the year 1955-56 domestic gas accounts represented 63% of the Division's annual output of about 71,218,000 therms. This percentage is high in relation to the Board's figure of 55%.

The Domestic Load

Many reasons for the fall in average consumption per domestic consumer have been given. In my opinion the two most valid are, first, that due to the improvement in the housing situation, not so many persons are being supplied with gas through one meter; and secondly, the increased efficiency of new appliances. A number of other reasons that have come to my knowledge would, in my opinion, have the effect of reducing domestic consumption.

Some other reasons, however, while accounting for a loss of domestic sales, may have the effect of increasing sales of gas in other directions. For example, the growing tendency to supply school meals means that some of the domestic load has become 'commercial.' Likewise, increased use of launderettes has done away with the need in some homes for the use of the wash copper or washing machine, but launderettes themselves usually take a substantial amount of gas.

But the principal cause of the decline, in my opinion, is the effect of competition from electricity, oil and solid fuel, and this fact has not received the prominence which it should. Furthermore, I doubt very much whether sufficient attention has been paid to consumers' trend of habits.

When competition is considered, one immediately comes up against the problem of price. I know that price is not necessarily the main factor; the industry has for years made substantial sales of industrial gas at relatively high prices. But in the long run major increases in sales can only be made if the price is competitive. It is well known that the gas industry's competitive position in relation to electricity is much less favourable than it was before the war, and some members of the industry have said that the relative price of gas is too high. In my opinion, relative price is the principal cause of dropping sales. Although we have, for all practical purposes, a monopoly in the manufacture of gas, with a few special exceptions we have no monopoly so far as use is concerned. Almost everything that can be done with gas can be done with electricity, or some alternative fuel.

Unless the relative competitive position of gas and its rivals changes in our favour, I cannot foresee a big expansion in the domestic gas market. At the most, I feel, we may hold what we have and perhaps make a modest increase. I am certain that those in contact with the commercial field are aware of the facts, but it is usually an unpleasant and thankless task to report indifferent news. One is liable to be dubbed a pessimist but, as I see the position, there is little use in deluding ourselves.

I am not suggesting that we need go about with an air of despondency. In the last annual report of my Board it is mentioned that gas consumption reached a level under normal temperature conditions about 36% higher than in 1938. Furthermore, during the year 1955-56 the millionth *additional* gas appliance since nationalisation was sold. From time to time it has been said that the gas industry has been 'at the cross-roads.' On each previous occasion, the circumstances have been faced and the industry has gone on to greater strengths.

Service to the Consumer

Since the war, service costs have mounted steadily, and the problem now is how to increase the effectiveness of service without unduly increasing costs. Service to the consumer stems broadly from a combination of system and personal service. It is, I think, generally agreed that the service obtainable from commercial undertakings in this country before the war was provided more cheerfully and courteously than is the case now; that is, the personal aspect was more pronounced. The gas industry as a whole had, and still has, a good record in this matter.

Our large working units have many advantages, but their existence means that a consumer order or request passes through a number of hands, with the result that, if somewhere there is any lack of personal interest or sense of urgency there can be undue delay and poor service generally. This is seldom the fault of the system in use, but almost invariably is due to some personal failure. Here lies the principal opportunity to improve service without any alteration to system or, what is more important, addition to costs. If more and more of our employees can be induced to take a keen personal interest in all service matters, it follows that the standard of service will improve.

By far the greater majority of my investigations into complaints reveal errors and omissions due to human failings, rather than to any weaknesses in the system itself. I regard these investigations as a check of considerable value, but it is necessary to differentiate as between the important and the unimportant.

The Cooking Load

If in domestic premises the cooking load is lost, the result may well be the complete loss of the gas installations.

When the tenants arrive on a new local authority estate on 'letting day'—when they decide on whether to accept a dwelling—they are directed to the local authority office and from there to ourselves and the electricians. It is usual for both undertakings to have allocated to them a flat or house in which they can display suitable types of apparatus. These premises are not furnished in any way, but it is usual for appliances to be connected and in operation.

New Housing

Direction indicators show the way to the gas and electricity dwellings, and usually mobile showrooms are present. The electricians and ourselves have the advantage of having made many prior contacts.

With local authority dwellings one is usually dealing with a family of several children. Some of these families already have modern gas cookers which can be transferred; most have already used gas. To the year ending March 31, 1956, and for my Board as a whole, some 82.2% of tenants, involving 139,692 dwellings, have (from the commencement of building after the war) decided upon gas for cooking. Some of the most difficult cases with which we have to deal are those of consumers who have been transferred from all-electric prefabricated dwellings. They have had some years of cooking with electricity and although a substantial number have

preferred to change to gas, the majority continue with electricity.

With regard to private building, here and there one finds an estate being erected by a speculative builder, but more often the builder is constructing a single house, or a few houses to a definite order. The 'contact' work in these cases is much more difficult and expensive. Even so, the number of private house buyers who choose gas for cooking is in excess of 80%.

Competition from Paraffin

The rapid increase in the use of paraffin for space heating in domestic premises is one of the features of the last few years. Mr. Hart in his paper presented at the last Autumn Research Meeting of the Institution of Gas Engineers, stated that on the basis of a survey carried out in August, 1956, it was estimated that one in five of all domestic premises in the country had one or more oil stoves or oil convector heaters, and that a third of these households had purchased in the past year.

At the gas Sales and Service Conference at Ayr in September, 1955, it was revealed that one manufacturer producing similar types of appliances capable of burning either paraffin or gas was, in fact, turning out 30 paraffin heaters for every one burning gas. Since then the position has still further deteriorated so far as we are concerned, and by October, 1956, the figures had become 54 to one in favour of oil.

What are the reasons for the undoubted popularity of paraffin? I think the principal reasons are: (1) They are cheaper, carrying no purchase tax; (2) they are portable; (3) there are no installation charges; and (4) due to the low sulphur content of the paraffin, the products of combustion are more acceptable.

I do not think running costs, which may or may not be cheaper than gas, have quite so much bearing on the problem, although in the minds of many people there is the idea that just as they expect gas to be cheaper than electricity, so do they expect paraffin to be cheaper than gas.

I believe that in the future paraffin will not offer any real advantage, except in special circumstances, so far as running costs are concerned. But if we are to recover a substantial portion of this load, appliance prices must be competitive. The most obvious solution is that purchase tax should be removed from gas and electric heaters or, alternatively, oil heaters should be made subject to an equal rate of tax. Nevertheless, we cannot expect any large scale success until the sulphur content of gas is reduced.

DISCUSSION

Members who took part in the discussion quickly got on to the subject of how and where to look for additional load.

Mr. G. H. W. Madge, Assistant Commercial Manager, North Thames Gas Board, said that industrial gas was sold at a higher price on the grounds that there was a better service involved—that was the way to make progress, although it must be done economically. He thought that the paper was 'a little light' on the question of where to look for additional load—although Mr. Madge hastened to point out that he could sympathise, knowing the difficulties.

Traditionally, the industry looked towards water heating, especially during the summer time, to reduce the disparity in seasonal load, and towards refrigeration.

'I think,' said Mr. Madge, 'we looked with more confidence to the refrigeration field before the war.'

Unlike other contributors to the discussion, Mr. Madge left continuous space heating till last, when he said that both this form of usage and solid fuel ignition could receive 'a tremendous fillip' from the implementation of Clean Air. It might be, he said, that consumers would get allowances for installing continuous space heaters.

Always interesting to listen to, **Mr. J. D. C. Woodall,** Sales and Service Manager, Kent Suburban Division, South Eastern Gas Board, maintained that the author had been 'singing the blues.' It was no use crying over lost therms, added Mr. Woodall. In fact it was possible to be encouraged by the fact that these losses were caused by changes in social habits.

When preparing two hot water bottles for his wife the other evening he had calculated that if he were to buy an electric blanket, the loss to the gas industry would be four therms a year. In other words, the introduction of electrical gadgets was having some effect. But the industry was holding its base load.

Mr. Woodall was not sure that the competitive position was so bad either—although it was definitely not as good as before the war. But so far as competition from solid fuel was concerned they were better off than ever before, as the gap between the price of the two fuels closed up. The replacement of one ton of coal by gas heating meant an additional sale of 100 therms.

For millions of people who went out to work each day, he went on, there was no doubt that the best form of continuous living room heating was a gas supply.

Mr. Woodall said: 'Why haven't we sold more fires? The main reason is the 60% purchase tax. If that goes it will provide just the encouragement our salesmen need. If, as I believe, there is a great potential for gas for space heating, it would give an incentive for our boards to consider a far more favourable two-part tariff than at present.'

Mr. H. Stirling Everard, Manager, Market Survey Section, North Thames Gas Board, agreed with a previous speaker who had said that 40% of the loss of domestic load per consumer was due to the advent of smaller households. He said 'I think I can add something about the remaining 60%. We (market survey) analysed the Board's domestic consumption on the basis of age of housing, and we found that in pre-war properties the Board were holding the pre-war level of apparatus.' It was in post-war housing that the decline in consumption came, said Mr. Everard. The loss in consumption by similarly-sized families amounted to 10 to 15 therms a year. Now that the proportion of post-war homes was significant, this reflected itself in a falling average load per domestic consumer.

The bath water heater was practically non-existent in new housing, and there was not a sufficient increase in multi-points to compensate for this. Fires were being fixed at a tenth of the pre-war number; and although we still had 80% of the cooking load, the load of each cooker was diminished by other apparatus. An efficient comprehensive non-gas water heating system for instance, robbed the cooker hotplate of possibly 30 therms or more. This downward trend could only be reversed by regaining the initiative in fields additional to cooking; and if they could not compete, because of high fixing costs and in particular fluing, while using the present range of apparatus, then they must concentrate their ingenuity on devising new apparatus which circumvented these difficulties.

Mr. Everard said it was his personal opinion that the first cost of apparatus, and in particular, high fixing costs, was the greatest deterrent to gas sales. But the battle for gas sales began with the architect and the local authority, long before the actual consumer even came into the picture.

Mr. T. V. Garrud, Controller of Services, North Thames Gas Board, was 'rather disappointed' to see that the author had omitted to say what he felt about the production in the future of appliances that would require less servicing. This represented a fairly heavy contribution to the gas price.

Mr. A. F. Hetherington, Deputy Chairman, Southern Gas Board, mentioned the extraordinary effect tradition seemed to have. 'We have areas where water heaters sell with the utmost freedom, and other areas where we just can't sell them.'

Mr. J. A. Buckley, Divisional Manager, Eastern Division, North Thames Gas Board, said that as a colleague of his he would like to correct any impression that Mr. Poulter was a pessimist. 'We have all been accustomed to low-deposit, long-period hire purchase, and I think we have got to re-orientate our ideas.'

Mr. Poulter, replying, said he had written the facts deliberately and with due consideration—he had not tried to write them up. And he pointed out that although he had said they could not do much more than make slight gains, at the end of his paper he had also said they would meet the challenge. 'Whether we like it or not, until purchase tax comes off, I cannot see a terrific increase.'

Some people had said that water heating was the biggest potential load, others, space heating. His own preference for a big increase quickly was space heating.

On service, he made a plea for standardisation, saying, 'We have left-hand driving on the roads, why can't service fittings be on one side or the other of a cooker, I don't mind which.' Every time a cooker was fitted there was a chance that it would cost 10s. to 15s. to fit a cross-over pipe.

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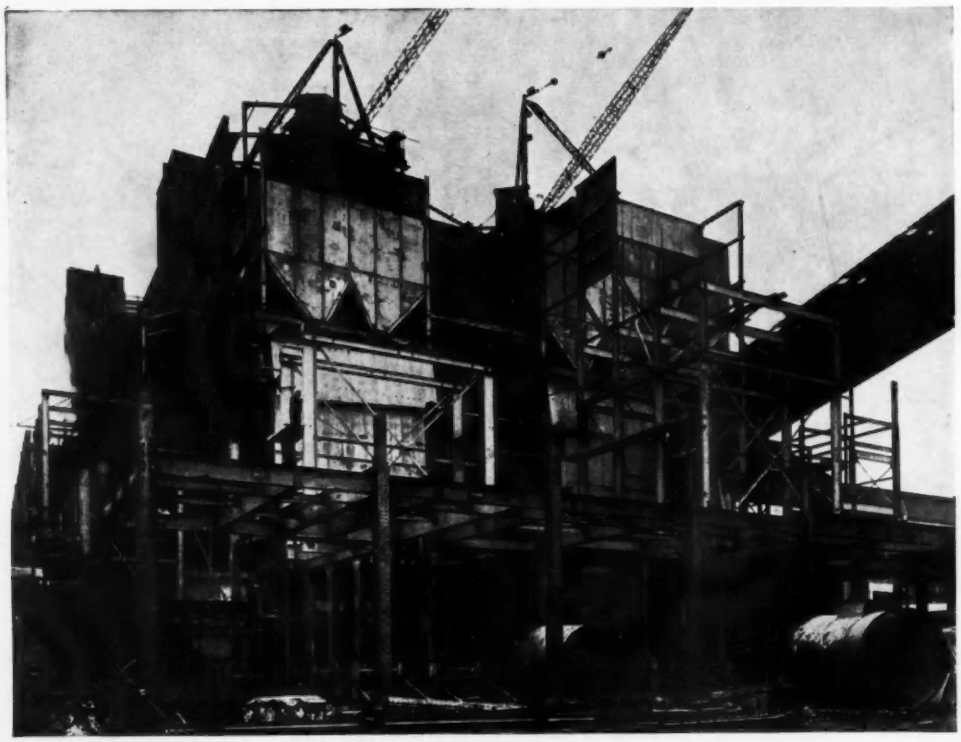

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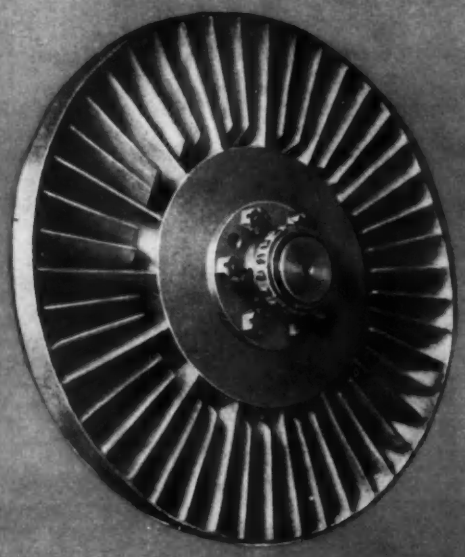

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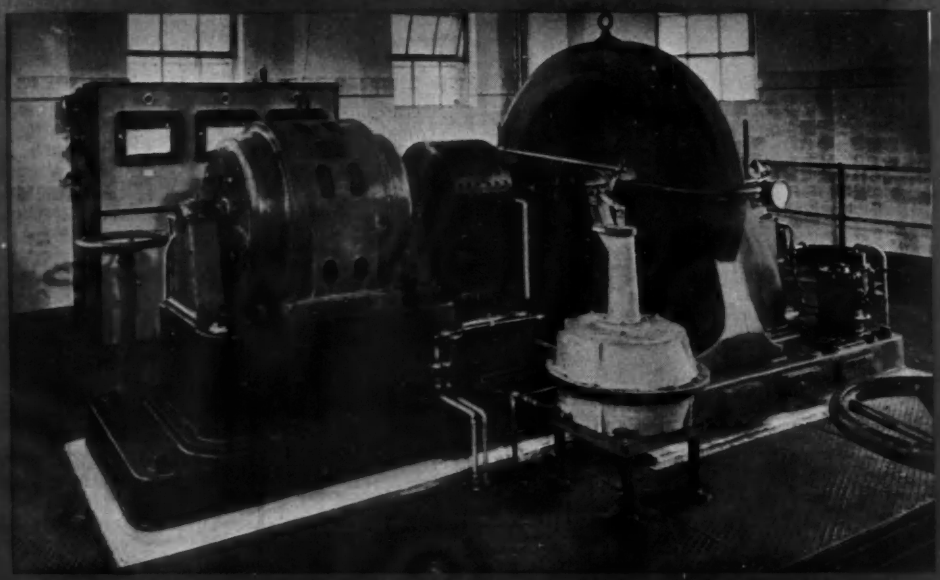

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From a paper to the Yorkshire Junior Gas Association on February 16

Prestressed Concrete Applied to a Gasholder Tank at York

By T. ALBONE, A.M.I.Mech.E., Assoc.M.Inst.Gas E.
CIVIL AND STRUCTURAL ENGINEER, NORTH EASTERN GAS BOARD.

THIS paper deals mainly with the design and construction of a tank, partly below ground level, for a spirally guided gasholder now under construction at York, and introduces a relatively new system of concrete construction. Before proceeding with details a brief outline of the development and technique of prestressed concrete will be of general interest.

Prestressing is comparatively ancient, and has been used for more than a century in the construction of gun barrels by wrapping the barrels with steel wire hoops, so it is perhaps surprising that its application to concrete construction has only been developed to the degree of perfection of the present day within the last 15 years. Although there is little doubt that some of the advantages of prestressing concrete have been appreciated by engineers since the beginning of the century, the use of unsuitable materials, and the failure to appreciate the behaviour of such materials under load brought little success to the early investigators.

General Principles

In order to understand the principles and advantages of prestressed concrete it will be useful to consider first normal reinforced concrete and appreciate its inherent weaknesses.

Normal reinforced concrete is formed of sand, Portland cement and coarse aggregate mixed with water in the correct proportions and used in conjunction with mild steel reinforcing bars. The steel resists the tensile forces acting on the member and the concrete resists the compressive forces, since it must be emphasised that concrete is considered incapable of resisting tensile forces, and the purpose of the steel therefore is to resist all these forces, though a good concrete can take very high compressive forces even as great as 12,000 lb. per sq. in.

To carry this a step further, the value of Young's modulus for concrete is very low compared to that for steel, and if Hooke's Law is applied, the tendency for the concrete to elongate under the same load is very much greater than that of the steel. In fact the concrete does not elongate, but cracks, and this cracking takes place long before the steel is taking its working load. This condition is shown diagrammatically in Fig. 1 which represents the stresses in a concrete beam under varying load.

The left hand condition at low stresses indicates compression in the upper portion of the beam and tension in the lower portion, and the centre condition applies when higher stresses are induced due to increased load; the compression in the upper section of the beam increases, whereas in the lower portion the concrete cracks and the tension zone disappears.

The right hand diagram shows the same condition but with a steel reinforcing bar introduced to take the tension.

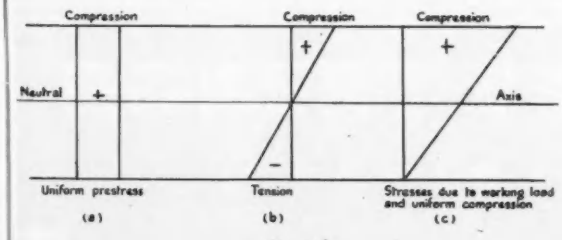

Fig. 1.

Though the cracks are generally very fine, they are a source of weakness and in certain conditions allow moisture to penetrate to the reinforcing steel, with subsequent corrosion which causes damage and disfigurement to the concrete member.

Since the cracking of the concrete in tension has been shown to be a fundamental weakness in reinforced concrete design it will be interesting to consider the effect of applying external forces to the member so that the concrete is always in a state of compression even under working load. This condition is indicated diagrammatically in Fig. 2.

The left hand diagram (a) indicates the stresses induced in a concrete beam subjected to uniform prestress. The prestress will be equal to the maximum tensile stress which would be

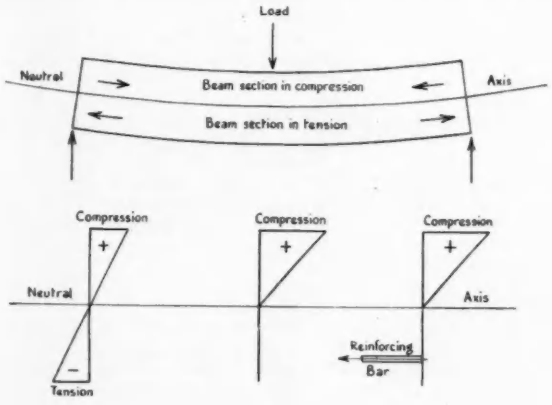

Fig. 2.

expected in the lower portion of a normal reinforced concrete beam. The centre diagram (b) shows the stresses induced due to a working load, and the right hand diagram (c) is the result of adding together the stress condition represented by the first two diagrams where it will be seen that the tensile stress in the lower zone is cancelled out by the compressive stress due to prestress.

The ideal condition of no tension in the concrete under working conditions can be achieved therefore by applying an initial compressive force to the concrete, and although the application of such a force is comparatively simple, the problem of maintaining it constantly throughout the life of the structure introduces complex problems, which has probably been the greatest stumbling block in developing the technique of prestressed concrete.

Difficult to Achieve

A simple application of prestress to material having no tensile strength is clearly shown when a number of books are lifted from a shelf; the books are pressed together between the hands giving an artificial tensile strength equal to the pressure applied by the hands.

This idea is sound but the task of compressing the concrete by forces acting externally is difficult to achieve in practice, though a simple and satisfactory alternative method is to

stretch wires or bars inside ducts in the concrete member by means of a jack. The wires are anchored after stressing, leaving the required compression in the concrete.

This is basically the solution to the problem and is in fact the method which has been developed and is in use at the present day, but the problem of maintaining the compressive stress in the concrete hindered the development because concrete shortens over a long period of time (known as creep) to an extent equal to 1/1000 in. per in. of length, and shrinks during its early life to an amount equal to 1/2000 in. per in. of length.

The steel wires must, therefore, be tensioned to a much higher stress to allow for the creep and shrinkage of the concrete, which is equivalent to a loss of 30 to 45,000 lb. per sq. in., and so high tensile steel wires must be used with a jacking stress of anything up to 200,000 lb. per sq. in. After allowance for creep and shrinkage has been made, the working stress in the steel to cause compression of the concrete will be approximately 150,000 lb. per sq. in.

Methods of Stressing

Methods of stressing the concrete can be divided broadly into two groups.

(1) The bonded wire system, in which the high tensile steel wire is stretched between two fixed anchorages at either end of the mould for the concrete member. The concrete is then placed in the mould, vibrated and allowed to harden to a fixed strength. On release the wires are prevented from returning to their original length partly by the bond between the wire and the concrete and partly because the wire returns to its original diameter where it emerges at either end of the member and acts as a wedge. The stress set up in the steel wire compresses the concrete giving the required prestress to the member.

(2) The non-bonded wire systems, in which ducts are formed in the concrete member during construction by means of rubber cores which are withdrawn when the concrete has hardened. The steel wire cables are then passed through the ducts and anchored at one end by hard steel wedges. At the other end of the member the wires are held by a jack acting against the end of the concrete member which stretches the wires to give the required compression in the concrete. The wires are then anchored by wedges to prevent loss of tension and the jacks removed. After wedging is completed the cables are grouted by injecting stiff cement grout into the ducts under pressure.

Various non-bonded wire systems have been patented, notably the Freyssinet, the Magnel Blaton, and the Lee McCall systems. The concrete tank at York is stressed on the Magnel Blaton system, but the technique of stressing is somewhat different from that used in beam construction, so to explain the principle involved a short description of the system as applied to a beam is given.

In the Magnel Blaton system the anchorage is of hardened steel plates with wedge shaped grooves machined in the upper and lower surfaces. The wires are placed two to each groove and are fixed by machined steel wedges driven between the wires. Each plate takes the ends of eight wires. The anchorage or sandwich plates bears against a hardened steel distribution plate at the end of the beam which distributes the prestressing force uniformly over the area of the plate. The jack is hydraulically operated and grips and stresses two wires at a time. When the extension of the wire is sufficient to give the necessary stress the steel wedge is driven between the wires, the jack released and the next two wires stressed.

This simple explanation of the principles of the pre-stressing of concrete and the system used at York help to show what was behind the design of this gasholder tank and emphasise the advantages to be gained.

The Gasholder Tank at York

In 1951 the North Eastern Gas Board were considering the building of a new gasholder at York, which was required to replace an existing holder which had reached the end of its useful life and would allow the Klönne waterless gasholder to be shut down for repairs and still maintain the necessary storage capacity of the works.

High and low pressure storage schemes were considered, and it was finally decided to proceed with the construction of a low pressure holder of the water sealed spirally guided type with a capacity of approximately 2 mill. cu.ft. The holder, as built, has three telescopic lifts of all welded construction and required a tank 165 ft. diameter by 33 ft. 9 in. deep inside. Two pipe chambers for 30 in. diameter inlet and outlet gas mains were constructed monolithically with the concrete tank.

During the site investigation five boreholes were sunk on the site and revealed 3 ft. of fill material underlain by very stiff boulder clay. This boulder clay terminated at about 30 ft., and was then underlain by sand or sandy gravel. An indication that this strata was continuous was given by the behaviour of the ground water, which rose in the boreholes to a depth of 18 ft. below the average surface level of the site. A pumping test was carried out by sinking a 15 in. diameter borehole to a depth of 41 ft., but it was found that choking of the pump by sand could only be avoided when the pump was placed at 34 ft. below ground level. At this depth pumping at the rate of 1,100 gal. per hour kept the water level constant, and under these conditions large quantities of sand were passed through the pump. As the surface area of water bearing sands to be exposed by the main excavation for the tank would be more than 500 times as great as that exposed in the borehole, very large quantities of water would have to be dealt with, and the danger of subsidence to surrounding structures caused by withdrawal of sand would be very great indeed. It was therefore decided to raise the bottom of the tank into the boulder clay and only leave the pipe chambers in the water bearing sands.

Originally the required storage capacity for the gasholder was to be two mill. cu.ft., and the most economical standard unit for this purpose would have been a spirally guided holder with a steel tank at ground level, and four telescopic lifts at a fully inflated height of 159 ft., but the final size and shape of the holder however differed greatly from this standard unit because of certain limiting factors.

Height and Depth Limits

The Town and Country Planning Authority required that the fully inflated height of the gasholder above ground level should be limited to 108 ft. and thus make it necessary for the standard unit to have the tank sunk below ground level, but for reasons given earlier, it was decided to limit the depth of the tank to 23 ft. 6 in. below ground level, so that there should be a depth of 6 ft. 6 in. of boulder clay under the deepest excavation with the exception of the valve pits.

The new gasholder was to be bounded on three sides by the existing Klönne gasholder, the railway sidings and the purifier installation, and so the ground space available for working and excavation was very limited. Bulk excavation with slopes to the full depth of the tank was impracticable, due to the risk of disturbance to the foundations of the other structures, especially for the Klönne gasholder, which is over 200 ft. high and particularly vulnerable since its foundations take the form of a tee beam only 15 ft. in depth.

The maximum loading on the subsoil due to the water in the tank, the weight of the concrete tank, the weight of the holder, and the direct load on the carriages caused by wind pressure on the fully inflated holder amounted to 30 cwt. per sq. ft. at the trough level and 10 cwt. per sq. ft. at the top of the dumpling.

From the borings taken it was considered that a figure of 3.5 tons per sq. ft. could be taken as a safe bearing pressure for the boulder clay.

The need to limit the depth of the excavation and the shortage of available working space made it necessary to design a gasholder with three lifts instead of four, with the tank partly below ground level and of a larger diameter than the standard unit. The capacity of the fully inflated holder would be reduced from two mill. to 1.8 mill. cu.ft.

The level fixed for the tank bottom was separated from the water bearing strata by approximately 6 ft. of boulder clay, but this layer of impervious material could not be assumed to be consistent over the whole area of the site and, since the standing water level was well above the tank bottom level, it was quite possible that large uplift pressures could be developed on the tank floor. For this reason a flat bottom tank was considered unsuitable, and a tank cross section with a central dumpling was decided upon. This shape of tank also reduced

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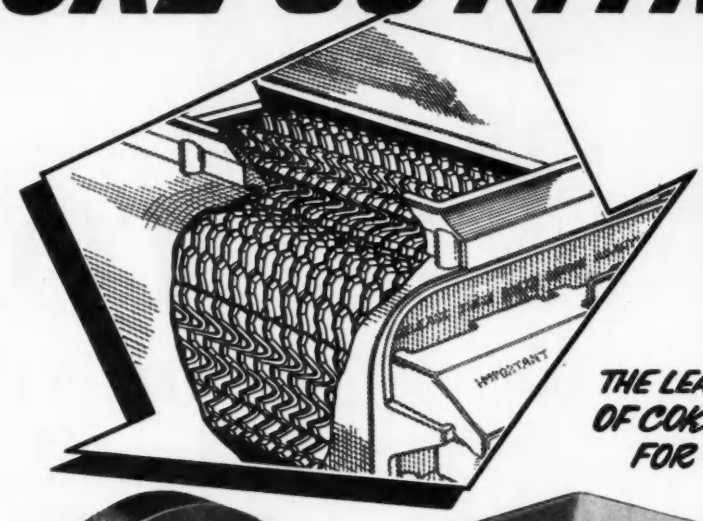

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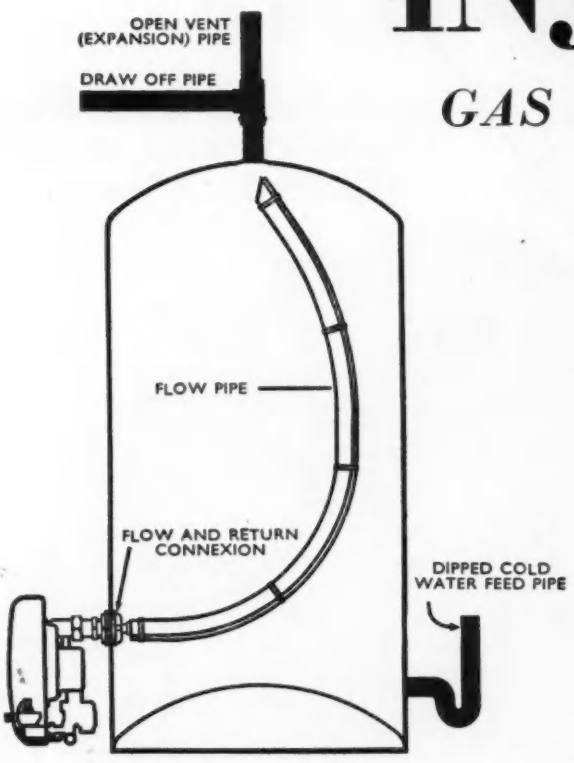

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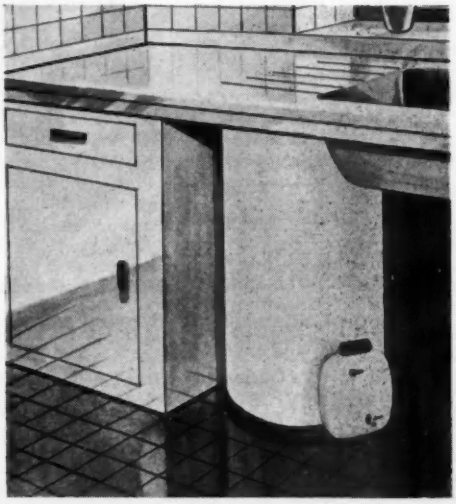

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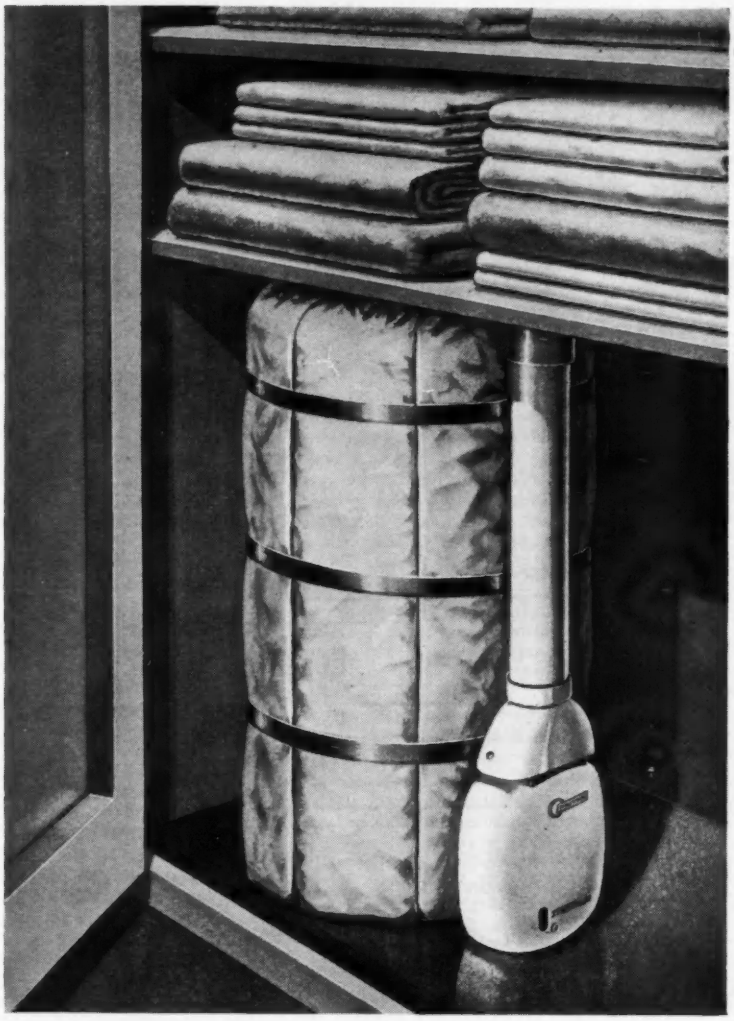

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PRESTRESSED CONCRETE APPLIED TO A GASHOLDER TANK AT YORK

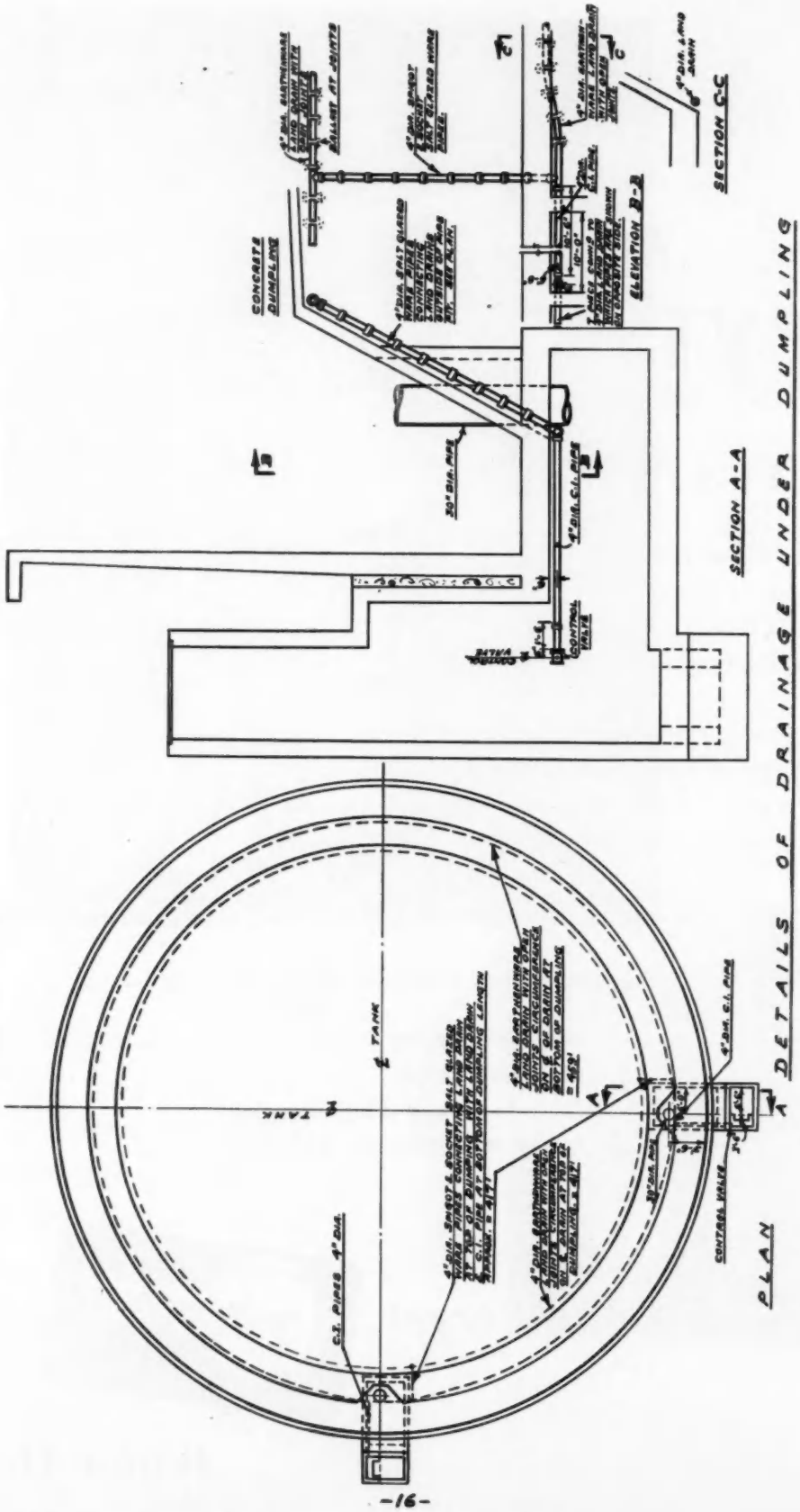

Fig. 3.

considerably the amount of bulk excavation required without affecting the working of the gasholder.

Three alternative forms of design for the concrete tank were considered:

(a) A tank designed with a free sliding joint at the base of the wall. In this design the hydraulic pressure from the water in the tank when full is resisted wholly by the ring tension in the wall, and the wall of the tank is made watertight by the provision of an encased bituminous membrane protected on the inside by a 6 in. curtain wall.

(b) A tank which comprised a prestressed upper circular wall in conjunction with a normal reinforced concrete trench and bottom. The hydraulic pressure on this lower portion is resisted partially by ring tension and partially by the wall acting as a cantilever with the base slab.

(c) A concrete tank prestressed on the pre-load system.

With this system the high tensile steel wire is wound round the tank continuously by means of a travelling carriage and the wire is tensioned by passing the wire through a die, but the large excavation required with this system to give working space for the merry-go-round was considered undesirable because of the risk of settlement to surrounding structures. The tank, too, would have had to be designed to resist the full pressure from the water without relief from the surrounding earth, which would greatly increase the ring tension in the wall and at the same time the amount of high tensile reinforcing steel required.

Estimates were prepared for the construction of the tank based on these three designs, but it was decided to adopt the partly prestressed design (b) for the following reasons:

(1) Lowest overall cost, (2) the excavation could be arranged to eliminate the possibility of settlement to surrounding structures by using bulk excavation with slopes to 11 ft. below ground level. At this level a 30 in. sq. concrete beam was constructed for the full periphery of the excavation to retain the slope and to allow vertical excavation below this beam to the full depth of the tank.

(3) Vertical excavation through the lower 11 ft. of boulder clay allowed the concrete in the wall to be placed direct against the clay without the use of external shuttering, which would give greater relief because of the external earth pressure.

(4) This design did away with the use of an internal lining or membrane which is often used in concrete tank construction. Watertightness is achieved by the careful mixing and placing of the concrete and by the wall being in compression when the tank is full as a result of the prestress in the upper 22 ft. The lower 11 ft. and the trough was constructed in watertight monolithic concrete to the Institution of Civil Engineers' Code of Practice for liquid retaining structures.

(5) There would be a saving in steel compared with a normal reinforced concrete tank since such a tank required 290 tons of M.S. bars while a partly prestressed tank only needed 120 tons of M.S. bars and 21 tons of high tensile steel wires.

Design Details

The upper 22 ft. of the circular wall was post-stressed on the Magnel Blaton system and the lower portion was designed for a monolithic construction of the wall and base slab. The tendency for the lower wall to be deflected outwards by hydraulic pressure is resisted by the base slab, and the wall acts as a propped cantilever which is affected by the post-stressing higher up the wall.

The design was based in the following stress limitations:—

Maximum Working Stresses	M.S. Reinforcing Bars.	Concrete.
Loads and bending moments due to water pressure.	12,000 lb. per sq. in. tension (water face).	850 lb. per sq. in. compression.
Loads and bending moments due to earth pressure, wind, etc.	18,000 lb. per sq. in. tension (remote face).	1,000 lb. per sq. in. compression. Tension nil.

Relief of internal pressure due to the supporting action of surrounding earth:

From ground level to 11 ft. below ground level	Nil.
At 11 ft. below ground level	500 lb. per sq. ft.
Increasing to a maximum 22 ft. below ground level	1,100 lb. per sq. ft.

The concrete in the trench bottom and the dumpling was of a nominal mix of 1:1½:3 and follows the recommendations of the Institution of Civil Engineers for liquid retaining structures, while the concrete for the wall was of a nominal mix 1:1.8:3.6 and was designed to give a minimum cube strength at seven days of 3,500 lb. per sq. in. To give the maximum strength to the concrete and to ensure that shrinkage effects were kept to a minimum the water:cement ratio was maintained at 0.48 and internal vibrators were used throughout for placing the concrete.

The ring tensions in the upper section of the wall are resisted by horizontal prestressing cables made up of 0·276 in. diameter high tensile steel wires and the spacing of these cables on the wall varies with the hydraulic pressure, from 41 cables at 1½ in. centres at the bottom to six cables at 8 in. centres near the top. The 0·276 in. diameter high tensile bright drawn steel wire has an ultimate tensile strength of about 225,000 lb. per sq. in. The jacking stress was 140,000 lb. per sq. in., and the actual effective stress in the wire after allowance for shrinkage, friction and creep of the concrete and steel would be a minimum of 92,000 lb. per sq. in. The design allowed for a residual ring compression of 100 lb. per sq. in. in the pretensioned portion of the tank wall with the tank full of water. After stressing was completed and the tank tested for water tightness, the prestressing cables were protected by coating the exterior surface of the tank walls with a layer of sand and cement mortar applied pneumatically with the tank standing full of water. The minimum thickness of this coating was 1½ in. which gave at least 1 in. of cover over the steel.

Stiffening Rib

At the top of the tank wall a 3 ft. 3 in. wide reinforced concrete beam was constructed to act as a substantial stiffening rib and a support for the concrete blocks carrying the spiral carriages. The beam also formed an inspection walkway and a concrete staircase provides access from ground level.

The beam is subjected to stresses due to the wind load on the tank and the fully inflated holder and to loads imposed by the water in the tank as follows: (a) Loads from the direct action of the wind load on the tank, (b) loads caused by the shear load of the wind on the inflated holder, (c) loads due to the overturning moment of the wind on the inflated holder, (d) loads from water pressure, (e) stresses due to the bending moments set up in the tank sides from vertical loads on the tank carriages, and (f) bending stresses from the direct action of wind on the tank and lower half of gasholder which tend to distort the tank at balcony level.

The overturning moments and shear loads on the inflated lifts are resisted by the carriages on the dips and tank balcony, and if the guide rails are so arranged that the holder rises in a clockwise direction the overturning moments tend to force the guides down on the left hand roller of each carriage on the leeward side of the holder, and up on the right hand roller on the windward side, and as the guides are fixed at 45° the holder tends to move in a direction at right angles to the wind. This movement is resisted by radial forces acting along the axles of the carriages, which in turn sets up tensile and compressive stresses around the balcony beam.

In the balcony beam 32 concrete anchor blocks were constructed which support the carriages and rollers operating in conjunction with the spiral guides of the holder. These concrete blocks are suitably reinforced and bonded into the wall of the tank to resist the overturning and shear forces transmitted from the inflated lifts of the holder. In the trough of the tank 48 concrete rest blocks were placed at equal distances around the circumference to carry the lifts of the holder when the holder is partly or wholly deflated, with a maximum load to be carried by each rest block of 13 tons, and a concrete block was built at the centre of the floor of the dumpling to carry the centre post which supports the crown of the inner lift when at rest. The load on the foundation was 75 tons and the floor of the dumpling was suitably reinforced at this point to spread the load uniformly over the floor.

The dumpling serves four main purposes, which are (a) to reduce bulk excavation, (b) to minimise the risk of blow up of ground water by reducing the width of the annular trench, and at the same time to maintain most of the weight at the centre of the structure, (c) to eliminate a long steel centre post to support the crown of the holder when at rest, and (d) to save tank water.

To make possible the inspection and maintenance of the inlet and outlet gas pipes, two vertical shafts 10 ft. long by 6 ft.

wide by 31 ft. 3 in. deep with a horizontal chamber at the foot and passing under the trough, were constructed monolithicly with the tank base. The design provided for the adequate bonding of the horizontal chamber to the wall footing slab and allowed for increased uplift at these parts of the structure and also to compensate for any possible differential settlement which could be caused by the widely varying loading intensities between the main tank wall and the pipe chamber.

Since the chambers pass into the water bearing strata the shafts and horizontal chambers were constructed inside steel sheet pile cofferdams, the piling from which was left in after completion.

With the gasholder tank empty it was considered possible that uplift pressure caused by the artesian head might develop under the dumpling concrete and so a system of drainage was provided to relieve this pressure by lowering the level of the subsoil water as is shown in Fig. 3. Earthenware land drains with open joints were laid under the concrete at the top and bottom of the dumpling slope; these drains were connected into each pipe chamber where they terminate in a control valve. When the tank is full of water these valves are closed, but when the water level in the holder tank is lowered significantly the valves are opened and any water is pumped away from the pits.

Construction

The majority of the excavation work was carried out in very stiff boulder clay, with slopes carried out to 11 ft. below ground level. The 30 in. square concrete beam was then constructed to the full periphery of the excavation to retain the slope and allow vertical excavation to proceed. The nature of the clay was found to be such that a vertical face could be excavated to the full depth of the tank and remained stable without any shuttering or shoring being necessary.

The trough bottom, which was 21 in. thick and a distance of 2 in. up the tank wall, was first concreted.

The internal vertical wall shutters, which were positioned in one complete lift up to the concrete ring beam, were fixed at the top by long bolts with the nuts let into the concrete ring beam, and left a wall thickness of 16 in. between the shutter and the beam. The concrete was placed in one lift directly against the boulder clay face externally, and after it had set the shutters were struck by unscrewing the bolts and withdrawing them from the wall leaving the nuts in the beam. The holes in the wall were later sealed with corks and stiff grout. The remainder of the wall was constructed in 3 ft. 6 in. lifts. Though the balcony beam and the carriage base blocks were not constructed until after the stressing operation, the continuity steel was fixed in position. The sloping wall of the dumpling was constructed at the same time as the main wall. This was 9 in. thick, reinforced top and bottom and was placed in one lift.

The whole of the concrete in the tank was vibrated with poker type vibrators and great care was taken with the preparation and construction of the horizontal construction joints between the lifts. The construction of the dumpling slab completed the work and this was carried out in alternate bays to minimise shrinkage affects.

All the concrete was mixed with a weigh batching plant suitably placed next to the tank with gravity fed hoppers for the concreting materials. Transportation of the concrete was carried out by petrol driven hopper wagons mounted on a monorail.

The valve pits were built inside cofferdams of No. 2 section Larssen sheet steel piles driven to a depth of 40 ft. below ground level and heavily strutted.

The large quantities of water and fine sand present caused considerable trouble during the construction of the bottoms of these pits and a 14 in. pump had to be in continuous operation during construction to lower the ground water level around the pit. Great difficulty was caused by the sand choking the pump, and to overcome this a quantity of the silty sand was dug out and a perforated oil drum filled with gravel aggregate was placed below the finished depth of the excavation surrounded by a coarse sand. The footvalve of the pump suction was placed in the drum which acted as an effective filter and allowed construction of the bottom section to proceed.

When the pipe chambers under the trough of the tank and the vertical shafts of the pits had been completed, the sheet steel piling was left in position.

The prestress was applied to the wall of the tank by tensioning high tensile steel wires which were located against the wall of the tank. These wires were grouped in four wire cables and spaced as mentioned earlier when the design details were being discussed. Location of the wires on the wall before tensioning was achieved by the use of flat steel hangers.

Tensioning of the wires was carried out at points 180° apart by means of the 'Magnel Blaton' hydraulically operated jack. At each tensioning point the wires were cut and lapped, and the anchorage point was located where the wires crossed. The wires were gripped at the anchorage point by an opposed type sandwich plate with the eight ends of the four wire cable located in grooves in the plate. As tensioning of the wires proceeded the extensions of the wires at the jacks were added together until the total extensions to give the required stress in the wire was reached; this was checked against the pressure gauge on the jack. Finally the wires were secured by driving in the steel wedges between the wires. The total extension at York was 1 to 11 in. giving a stress in the wire of 140,000 lb. per sq. in. To ensure that jacking took place simultaneously at the two points a field telephone set was used.

At York, because of the large number of cables, particularly towards the bottom of the prestressed portion, it was necessary to plan the tensioning sequence very carefully to avoid the sandwich plates fouling one another and the placing of sandwich plates on top of wires already tensioned. This was achieved by spacing the jacking points at 16 positions round the tank. It was interesting to note that the wall of the tank moved in $\frac{1}{4}$ in. from the circumferential ring beam after stressing was completed.

After tensioning was completed the tank which holds three mill. gal. of water was filled and remained full for a period of 14 days. During the filling operation the balcony beam and carriage base blocks were completed.

A number of small leaks appeared at the points in the wall where the bolts securing the shutters passed through the wall, but these were successfully caulked. The specification called for a loss of water of not more than $\frac{1}{8}$ in. over seven days, but evaporation losses, and the rainfall during the period made it impossible to adhere to such accurate measurements; in fact, the level of the water in the tank varied by $\frac{5}{16}$ in. over a period of 14 days, and this was accepted.

Enough boulder clay had been retained from the bulk excavation and had been stored on site for backfilling around the tank wall from the bottom of the prestressed portion to ground level. This material was bulldozed into position and consolidated by the tracks of the dozer. Subsequent weathering consolidated the material further.

Tolerance Limits and Quantities Involved

The tolerance limits specified for the concrete tank were:

Diameter of tank, ± $\frac{1}{2}$ in.; level of rest blocks, ± $\frac{1}{4}$ in.; distance between anchor blocks and rest blocks, ± $\frac{1}{2}$ in.; location of anchor blocks, ± $\frac{1}{4}$ in.; plumb of wall, ± $\frac{1}{4}$ in.; and the quantities involved were:

Total excavation, 12,500 cu. yd.; concrete, 1,980 cu. yd.; mild steel reinforcement, 120 tons; high tensile steel wire, 21 tons, or 200,300 lin. ft.; and the total cost of construction including all excavation and pumping, handrailing to balcony, ladders and platforms was approximately £59,000.

Maudslay Scholarships

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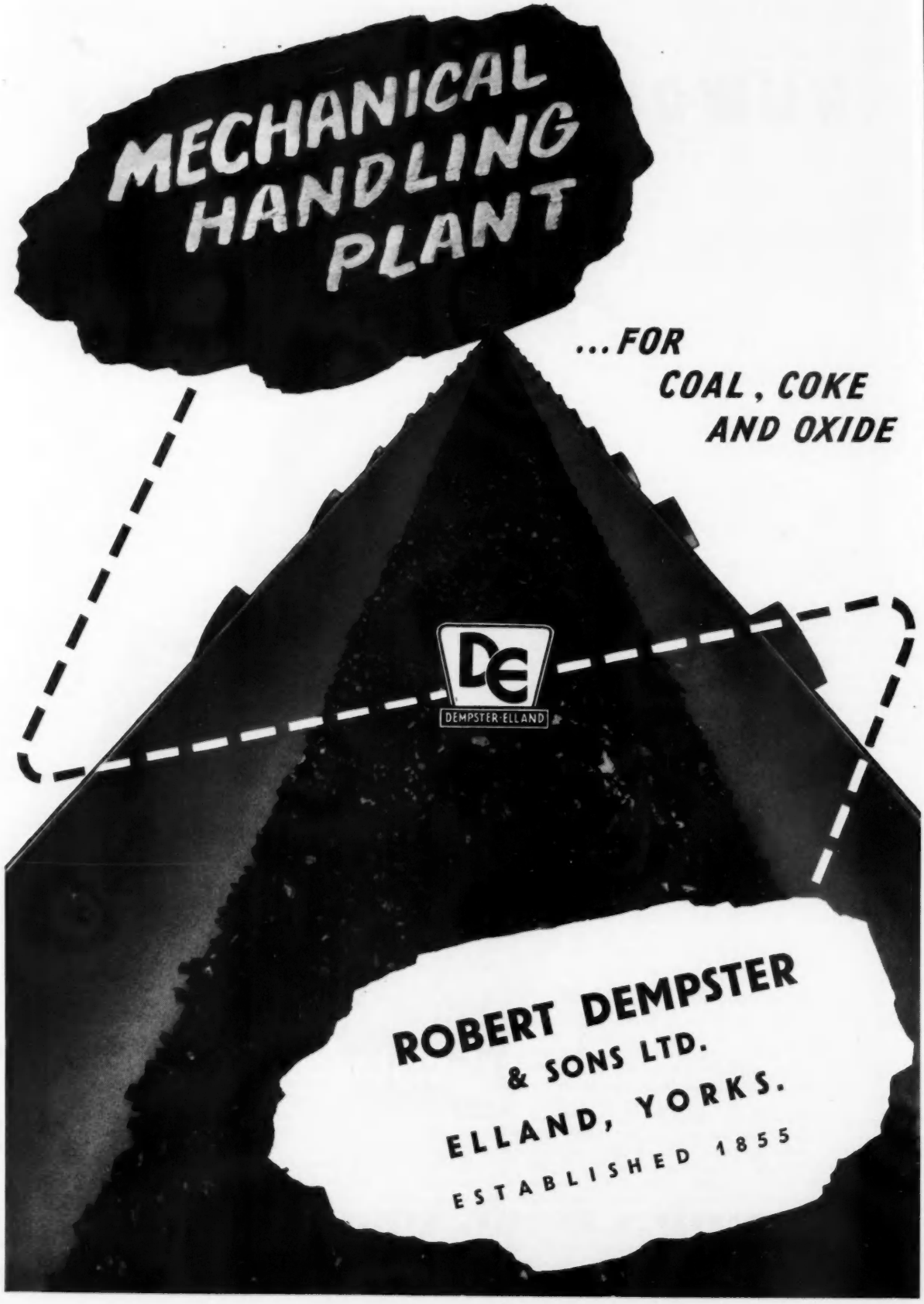
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The extra large grill is in an enclosed compartment with 'drop-down' door. It is quick-heating and powerful, and will take four large slices of bread or six to eight chops comfortably. When not grilling the 'arctic' blue enamelled interior provides ideal warming space for plates, in addition to the 'slip-on' plate rack which can be quickly fitted to the splashplate.

No more pans will tip and wobble on the new 'glide-over' flat top hotplate. Four new type extra rapid boiling burners are designed to give a fixed 'simmer' position. All these burners, enamelled spillage sections, and top bars are easily removed for cleaning. Push-in safety taps are fitted to all burners. A built-in strip light in splashplate gives a clear view into the pans when cooking is in progress on the hotplate.

The super-oven is beautifully streamlined with all corners smoothly rounded; finished in 'arctic' blue vitreous enamel, it will take a 30 lb. turkey. Single back burner with automatic lighting and safety 'cut-off' control is incorporated, while an outstanding feature is the 'slip-out' oven top which makes cleaning simple and quick. Oven fittings include two chrome 'non-tip' shelves, large enamelled meat tin and cake tray.

The Auto-range is available in all white or all cream—coloured insert facia panel, available in red, blue, green, or gold.

Overall height is 49¼ in; height to hotplate, 36 in.; width, 23 in.; depth, 23 in. Oven dimensions are height, 16½ in.; width, 17½ in.; depth, 15½ in. Gas connection is ½ in. B.S.P.

One piece body construction in heavy gauge steel gives maximum rigidity. The entire oven, oven door and grill door are heavily insulated against heat loss. Hotplate burners are of enamelled cast iron with a new type die-cast head. The burner tray and hotplate bars are also enamelled cast iron and in two sections for easy handling and cleaning. Oven and hotplate have separate governors.

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It is built of pressed steel on a heavy gauge base. The reflector is of polished nickel steel, and the burner is filled with five Bray No. 1 jets which when full on give a gas consumption of 12 cu.ft. per hour. The gas connection is ½ in. B.S.P.

The finish is two-tone high-grade stove enamel, the top, sides, and base being in a darker shade than the front.

Overall dimensions are—height, 27⅛ in.; width, 20⅛ in.; depth, 10½ in.—*General Gas Appliances, Ltd., Audenshaw, Manchester.*

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THE British Thomson-Houston Co., Ltd., reports that the demand from power supply authorities and industrial undertakings at home and overseas for electrical equipment of every kind kept BTH factories operating at full capacity during 1956. Many important installations of BTH power plant were completed in various parts of the world, among them hydro-electric generators in New Zealand, Norway, Scotland, and Uganda.

The leading position held by BTH high-voltage oil circuit-breakers was demonstrated by the order received during the year for 330 kV switchgear for the Kariba project—the largest contract from abroad ever placed in this country for switchgear.

On the industrial side, important installations were made in rolling mills, aluminium works, paper mills, steelworks, foundries and factories at home and abroad. An important overseas order for pumpless steel tank rectifiers, the largest rectifier order to be placed in Great Britain, was received from the Canadian British Aluminium Co., Ltd.

Mining equipment was supplied in large quantities and several large winding installations were commissioned. Among orders now in hand are those for tower-mounted friction winders for the National Coal Board.

Industrial electronic equipment of every kind remained in demand, perhaps the greatest interest being provided by applications of electronic control to machine tools. Development of electronic equipment proceeded at the normally high rate, and there was substantial progress in the development of semiconductor devices and special ultra-high frequency valves.

Progress in transport was marked by considerable activity in marine propulsion and other installations. Marine radar equipments were installed on several ships.

The modernisation of British Railways resulted in important contracts for motor-coach power equipment, and a notable achievement during the year was the installation of the world's first germanium power rectifier in traction service.

Developments in aircraft electrical equipment were concerned with the production of new machines and control gear for the complete power systems of large passenger aircraft, and with special equipment for high-speed aircraft.

In addition to these activities much research and engineering development took place on special equipment, including that for nuclear power stations.—*British Thomson-Houston Co., Ltd., Rugby.*

Flostat Provides Cheap Efficient Liquid Control

THE new Flostat method of liquid control is inexpensive and efficient since it combines a measuring element (flowmeter) and a controlling element (valve), both operated by the pressure energy of the fluid. The Flostat is a self-acting flow controller; no electric or compressed air supply is required for its operation.

It resembles a valve and fits directly in the pipeline. In its simplest form the Flostat is non-adjustable, being factory set for control of a certain fluid at a desired flow rate. In operation it delivers fluid within 1% of the set rate irrespective of variations of fluid pressure either upstream or downstream from the installation.

Outstanding design features include pressure balancing of the double-beat valve so that high sensitivity and response speed are achieved, and elimination of 'droop' associated with proportional controllers by a compensating effect. A wide range of flow setting can be obtained by change of orifice size and by alteration of bellows fixing to valve stem.—*G. A. Platon, Ltd., 323A, Whitehorse Road, Croydon, Surrey.*

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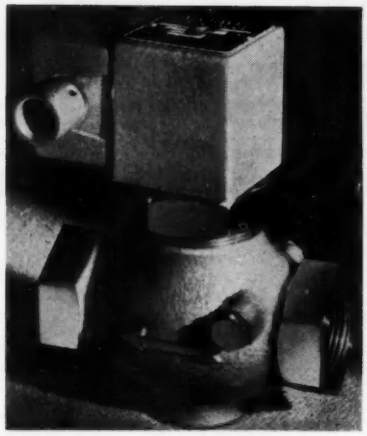
Automatic Control of Town Gas Flow

SATCHWELL SOLENOID GAS VALVE



DESIGNED to control automatically the flow of town gas, the Satchwell GV solenoid gas valve is available in sizes up to 1¼ in. B.S.P. It is not suitable for other gases such as butane and propane where a tight shut-off against high pressures is required, and in such cases the AMA valve should be used.

The GV valve can be used to control automatically the main gas supply to boilers according to the demands of the controlling thermostat or pressure switch. Where the boiler is being used for heating only, the valve can be controlled by the Satchwell compensator to vary the temperature of the circulating water according to the outside weather conditions so that the boiler output balances the heat requirement. It can also be used for controlling the gas supply to ovens according to the demand of a stem type air thermostat.

Where the main gas supply is too large for direct control by the GV, the ¾ in. valve can be used in the weep line to a main controlling valve of the diaphragm type, and in such applications control of the valve will be made by immersion or oven thermostat.

The valve body, which is a high quality casting, has a single seat which accommodates a stainless steel valve. The valve is fixed to the end of a plunger which is actuated by the solenoid, the design of the electrical and mechanical parts being such that silence in operation is assured on both alternating and direct current systems.

The valve is designed so that it opens when the solenoid is energised and stays open so long as the electrical supply is maintained. Should the electricity supply be interrupted either accidentally through failure or intentionally because the controlling thermostat or pressure switch becomes satisfied, the valve will close and remain closed until the supply is re-established.

Although the electrical and mechanical portions of the valve form a self-contained unit, they are separated by a gastight seal which prevents leakage. A pilot jet supply can be taken from the inlet side of the valve by removing one of the ⅛ in .B.S.P. screwed plugs which are provided.

The valve is supplied in four sizes from ⅜ in. to 1¼ in. B.S.P.—*The Rheostatic Co. Ltd., Slough, Bucks.*

ELECTRONICS

Aquatrol Provides Safe Control of Liquid Levels

A NEW level controller for conductive solutions—the Aquatrol—has been introduced by Fielden Electronics, Ltd. Developed expressly for the control of aqueous solutions, it provides simple, safe, and sensitive alarm, indication, and/or on/off control of electrically conducting liquids.

When suitable probes, connected to the electronic unit, make or break contact with the liquid under observation the relay incorporated in the unit opens or closes as required. The relay contacts may be so connected as to operate visual or audible warning systems, as well as pump motors, or any other control function required by the particular application.

Complete Protection

As is usual with Fielden instruments of this type, the 'Fail-to-Safety' principle is incorporated, ensuring the complete protection of the system. For the level control of acids, solutions of salts, effluent or any liquid containing a high

percentage of water the Aquatrol is ideal.

A further application is in pipe lines in which it is necessary to be warned if flow ceases. A manometer can be used to show this but it has the disadvantage that it only gives local indication, necessitating a personal check on site.

Using the Aquatrol, however, remote indication is possible and no-flow alarm may be given at any distance. Thus all vital points may be checked in a central office and immediate action can be taken. —*Fielden Electronics, Ltd., Wythenshawe, Manchester.*

Cannon Ends the Colour Problem

CANNON (GA) Ltd. have solved the problem which arises when a room is to be redecorated in a new colour scheme by making top grills and fenders available in a range of colours for their GasMiser room heater. It was the introduction of this heater with the exclusive Multyjet hot-air convector that made it possible to use gas for continuous room heating at a price comparable with that of coal.

These alternative colours are available as parts supplied complete, ready for fitting to the heater—a job the housewife can do herself in less than a minute. The cost is modest, list price of the two parts being £4 7s.—*Cannon (GA) Ltd., Deepfields, Near Bilston, Staffs.*

PUBLICATIONS RECEIVED

Electrical Test Gear

A descriptive brochure giving details of their comprehensive range of electrical test equipment has been issued by Foster Transformers, Ltd., one of the Lancashire Dynamo Holdings Group.

The Foster organisation represents over 50 years of specialist experience in transformer design and manufacture, and to-day, the range of Foster products, which includes voltage regulating and testing equipment, is one of the widest and most varied in the world.—*Foster Transformers, Ltd., South Wimbledon, London, S.W.19.*

Non-ferrous Metals

A new brochure giving concise information concerning the various non-ferrous metals in which they specialise has been published by Charles Carr, Ltd., of Birmingham.

Also received from this Company is a comprehensive catalogue of ther Lily brand non-sparking tools. *Charles Carr, Ltd., Grove Lane, Smethwick 40, Birmingham.*

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The "Gas Journal" has existed as an integral part of the Gas Industry since 1849. Unbiased policy, technical knowledge, accuracy and reliability combine with an extensive news service and modern make-up to make the Journal the leading Gas Industry newspaper.

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"Gas Service and Domestic Coke" is the specialist magazine for the Sales and Service personnel of the Industry. It covers all aspects of gas service from the holder to the burner and contains a special large section each month devoted to the utilization of coke. In addition to sound editorials, news items and specially contributed articles, "Gas Service and Domestic Coke" also reports in the fullest possible manner the activities of the numerous Salesmen's Circles, and Solid Fuel Bodies.

Annual Subscription: **18s.**

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Some current works covering the manufacture, distribution, and sale of gas are :—

KING'S MANUAL OF GAS MANUFACTURE. Now being issued in 10 self-contained sections. Sections available and prices on application.

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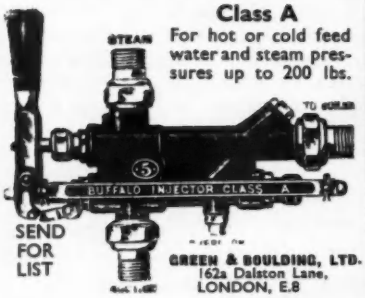

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SPECIAL OFFER: Large quantity of new cast iron fullway valves, all iron parts, 8 in., 10 in., 12 in. and 14 in. for sale. The Midland Iron & Hardware Co. (Cradley Heath) Ltd., Cradley Heath, Staffs. Tel.: Cradley Heath 6264 and 5.

CONTRACTS OPEN

BANGOR (CO. DOWN) BOROUGH COUNCIL

GAS DEPARTMENT

TENDERS are invited for the supply, delivery, and erection of a Coke-Grading Plant having a capacity of 10 tons per hour.

Specification and form of Tender may be obtained on application to the Gas Engineer and Manager, High Street, Bangor (Co. Down).

Tenders, in sealed envelopes, endorsed "Tender for Coke-Grading Plant," to be delivered to the undersigned at the Town Hall, Bangor, not later than 12 noon on Monday, April 1, 1957.

The lowest or any Tender will not necessarily be accepted.

T. B. GRAHAM,
Town Clerk.

APPOINTMENTS VACANT

SHIFT SUPERVISORS required for Coal Carbonisation and By-Product Recovery Plant near Chesterfield. Applicants should have experience of control of all types of labour and knowledge of steam raising and gas producer plants. Previous experience on similar Works an advantage. Concessionary fuel allowance is given. Write in first instance giving particulars of age, experience and salary expected, to No. 312, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

NEW ZEALAND

VACANCY No. 258, GAS EXAMINER, DOMINION LABORATORY, WELLINGTON

APPLICATIONS are invited from graduates, or persons with other suitable qualifications, for the position of GAS EXAMINER under the New Zealand Gas Regulations. Duties will involve regular visits to about 15 gasworks and considerable travelling.

Salary: Within the scale £935/£1,185 according to qualifications and experience.

Further information and application forms may be obtained on request from: The High Commissioner for New Zealand, 415, Strand, London, W.C.2, mentioning this publication and quoting Ref.: 3/64/133.

Completed applications to be lodged in London not later than March 31, 1957.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited from suitably qualified persons for the following pensionable appointments:—

WIRRAL GROUP
DISTRICT ENGINEER (DISTRIBUTION), SOUTH WIRRAL

The appointment will be based upon Chester, and the salary within Grade A.P.T. 12 (£900/£1,025 p.a.).

The successful applicant will take charge of the South Wirral District of the Group, and be responsible to the Group Distribution Engineer for all aspects of distribution engineering within that district.

Applications should be made on the official form, obtainable from the General Manager, N.W.G.B., Wirral Group, Hind Street, Birkenhead, and returned to him before March 15, 1957.

MANCHESTER GROUP
SENIOR INDUSTRIAL GAS ENGINEER—INDUSTRIAL CENTRE, WHITWORTH STREET WEST, MANCHESTER

The salary will be within Grades A.P.T. 10/12 (£820/£1,025 p.a.).

The successful candidate should have had a wide experience in the application of gas for industrial purposes and the selling and installation of industrial gas-fired equipment. Qualifications in fuel technology or in related subjects would be an advantage.

Applications, in envelopes endorsed "Vacancy No. 83," should reach the General Manager, N.W.G.B (Manchester Group), Town Hall, Manchester, 2, within 14 days.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
GROUP ACCOUNTANT—GRIMSBY GROUP

APPLICATIONS are invited from suitably qu accountants for the above appointment. T person appointed will be responsible for the sup vision of the accounting work in the Group and preparation of final accounts.

The salary will be within Groups A and (£1,025-£1,265 per annum) of the National Sa Table for Senior Gas Officers. The post is pe sionable and the successful applicant will be req to pass a medical examination.

Applications, stating age, education, qualifica experience, present appointment and salary, tog with the names of two referees, should be se the Divisional General Manager, Belle Vue Hou Carline Road, Lincoln, not later than March 11, 19

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.
February 18, 1957.

NORTH EASTERN GAS BOARD

BRADFORD GROUP
KEIGHLEY DISTRICT
SHOWROOM SUPERVISOR

APPLICATIONS are invited for the above posit at a salary within Grade A.P.T. 5 (Provinc 'A') (£575-£655 per annum) of the Salary Sca agreed by the National Joint Council for Gas Staf

Applicants should have a wide experience of sa of domestic and commercial appliances and be ab to supervise staff.

The successful applicant will be required to pass medical examination and to join the Board's St Pension Scheme.

Applications giving details of age, experience a qualifications should be sent to the Group Gene Manager, North Eastern Gas Board, Bradford Grou Britannia House, Bradford, so as to arrive not la than March 16, 1957.

J. C. GARDNER,
Secretary.

SOUTH EASTERN GAS BOARD

HOME SERVICE ADVISER
EAST SURREY DIVISION

SUCCESSFUL applicant will be required to condu demonstrations, give lectures and advise consume in their own homes in the use and care of g equipment in the Croydon District.

Preference will be given to applications fro persons who:—

(a) have had not less than three years' experien in demonstrating in Gas Industry; and

(b) have undergone training for two years at recognised training college of Domestic Arts; and

(c) hold a diploma in cookery, housewifery a laundry work.

Commencing salary within Grade 4 (Met. Area £557-£599 p.a. (appropriate Transitional Scale).

Applications will be considered from persons w have not the experience indicated in (a) above b in such circumstances, the commencing salary w be within a lower Grade than 4.

Applications, quoting reference V10/777, shou reach the undersigned within seven days.

R. J. MCCRAE,
Personnel Manager.

Katharine Street,
Croydon.
February 16, 1957.

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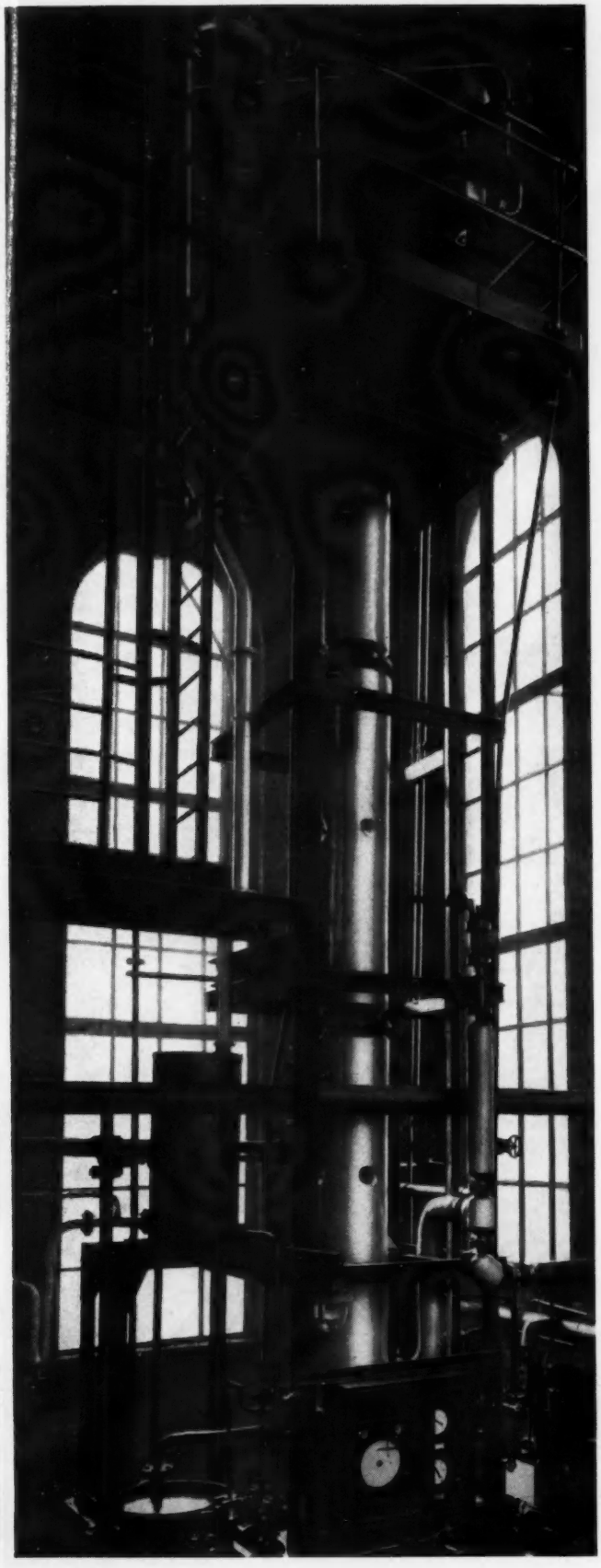

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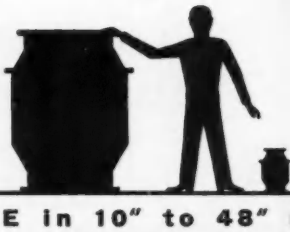

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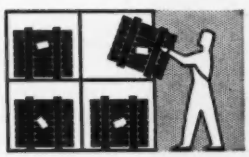

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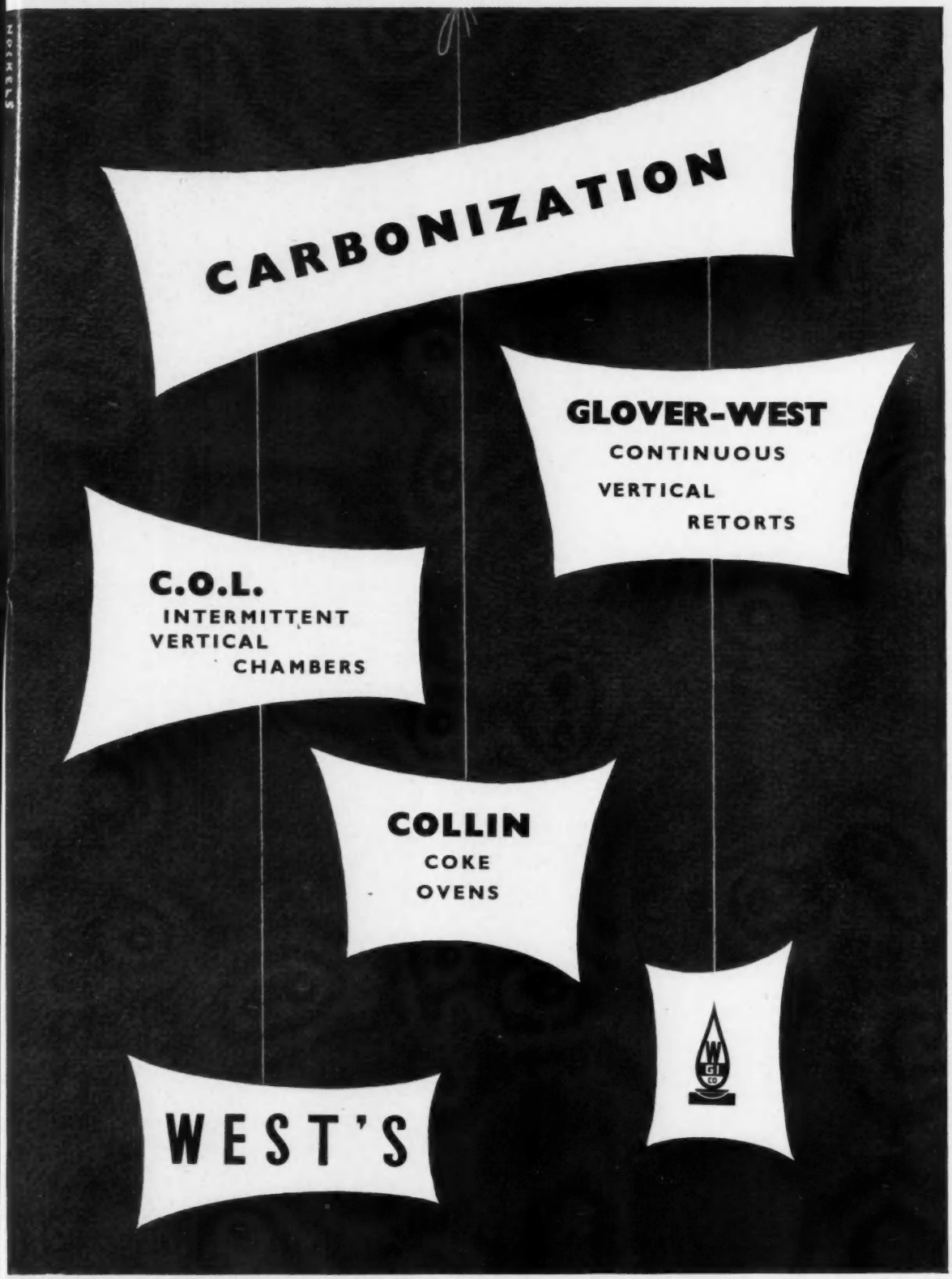

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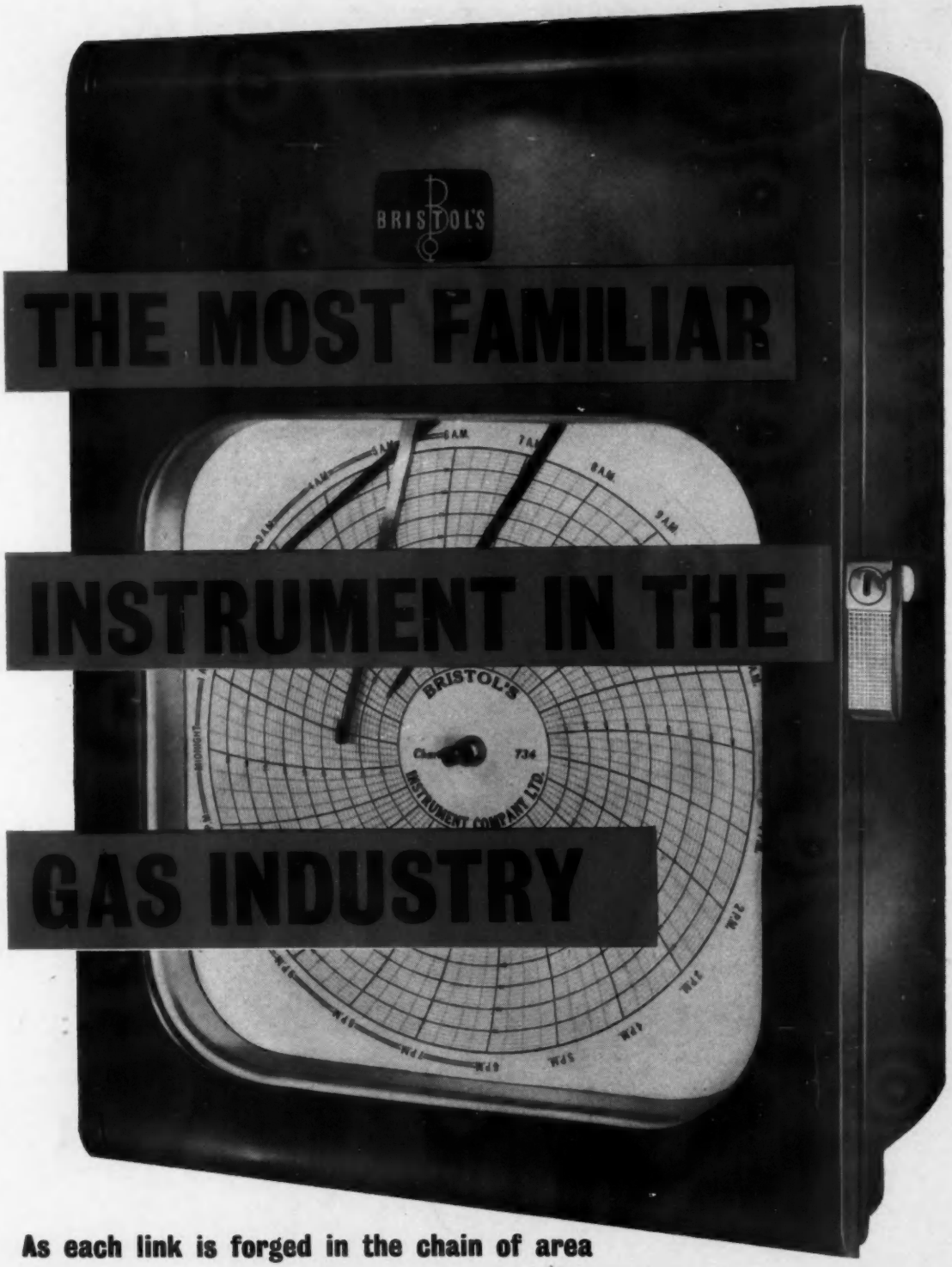

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